

# Rwanda Energy Group



2024-2034

## Strategic Plan

Delivering energy needs for National Transformation and Development



# **Strategic Plan of the Rwanda Energy Group**

**2024  
-2034**

## Foreword



Energy is the backbone of Rwanda's economy, essential for social and economic transformation. Reliable and affordable energy drives productive capacity, supporting sustainable development. Rwanda Energy Group (REG) will follow this agenda from 2024 to 2034.

In its first strategic plan (2017–2024), REG achieved substantial growth: During the implementation of the Company's first strategic plan (2017-2024), positive achievements have been registered in the 4 core business areas: electricity generation grew by 42.7%, from 218 MW to 406 MW of installed capacity; the high voltage network increased by 74%, from 664 km to

1,158 km while the distribution network increased by 62%, rising from 20,385.0 km of MV & LV network to 29,371.68 km; electricity access increased by 71%, attaining 78.9% of HHs with access to electricity in 2024 from 40.5% in 2017. Investments in generation have improved availability and reduced industrial tariffs, alongside operational efficiency gains in network reliability and loss reduction.

Looking forward, the Government aims for 100% electricity access, requiring integrated planning and investment to ensure sufficient, balanced, and cost-effective energy. Aligned with Vision 2050, the focus remains on affordable, reliable, and clean energy, modern and climate resilient infrastructure.

The Board is committed to collaborating with Management to execute key plans, including Least Cost Power Development and National Electrification. We will strengthen governance, enhance institutional capacity, and ensure continuous monitoring. Achieving our vision to be the leading regional provider of sustainable energy solutions will require support from stakeholders, end-users, development partners, and investors. We will keep stakeholders informed and engaged as we advance Rwanda's energy landscape.

**Dr Didacienne MUKANYILIGIRA**  
*Chairperson of the Board of Directors*  
Rwanda Energy Group

# Executive Summary



Rwanda Energy Group (REG), along with its subsidiaries Energy Development Corporation Limited and Energy Utility Corporation Limited, was established in July 2014 as part of the government's energy and water sector reform. The reform aimed to expand energy supply efficiently to meet Rwanda's growing demand.

REG's mandate includes improving operational efficiency, attracting investment, enhancing planning and accountability, and accelerating energy access. While REG operates under a government mandate, its success is measured by the real benefits it brings to Rwandans—reliable, affordable, and accessible energy for socio-economic growth.

This Strategic Plan reflects REG's commitment to delivering reliable and affordable energy for all end-users. It prioritizes effective planning, project implementation, and infrastructure operation to meet Rwanda's energy needs. Our SMART strategic objectives and actionable initiatives drive REG's mission to ensure sustainable, impactful energy solutions across the nation.

This plan is anchored on 5 pillars encompassing 15 strategic objectives including industry focused objectives and institutional focused objectives as follows:

Pillar

**Develop a cost-efficient and sustainable green energy mix to meet growing demand and expand to the regional market.**

1

**1. Generation:** Build a balanced and cost optimized generation mix sufficient to meet the growing demand.

The objective will be to increase installed power generating capacity from 406 MW to 1066MW and above as demand growth will require. This will be done while ensuring the policy targets of at least 60% of the energy mix coming from renewable energy sources; and reserve margins of 15% of the peak demand. This will enable the power system to accommodate short-term demand growth above the 12% demand-growth scenario. Regular preventive maintenance and rehabilitation will be progressively conducted to maintain plants availability at between 97%-98% availability.

**2. Transmission & Distribution:** Plan, build and operate transmission and distribution infrastructure to ensure timely alignment of current and future generation with national demand, enhance utility efficiency and reliability of power supply.

Network expansion will be undertaken to transport generated power to various from 1,158 km to 1,709.9 km. The MV and LV network will expand to 13,168 km and 23,392 km respectively. Regular maintenance will be conducted to ensure that the transmission line system availability is maintained at 97% availability throughout the year.

**3. Tariff Evolution:** Develop a clear tariff trajectory with clear milestones based on effective engagement with IPPs, financiers and other stakeholders to achieve affordable tariff.

Adequate investments will be made to ensure cheaper sources of power are prioritized and efforts will be made, in collaboration with stakeholders to ensure that affordability guides

tariff evolution. In this regard, the aim will be to maintain tariff increase less than GDP per capita growth.

Pillar

### Ensure universal access to modern and clean energy.

2

**4. Electricity Access:** Achieve 100% national access to electricity driven based on grid and off-grid solutions.

Expanding electrification will continue to drive REG expansion plans with the aim of achieving universal access to electricity by 2029 from 78.9%. The National electrification plan objective is to use a blend of grid and off-grid connection of 75% and 25% share of households respectively. Emphasis on grid electricity will help in livelihoods improvements by enabling economic induced effects of electrification (small and medium scale economic activities; electric cooking to reduce biomass energy consumption, etc.). The plan also aims to connect all productive users of electricity by 2029.

**5. Access to modern and efficient cooking technologies:** Scale up use of efficient cooking technologies, increase adoption of clean cooking solutions and achieve full adoption of clean and efficient cooking technologies and heat production by institutional and commercial entities.

Building on the National Integrated Clean Cooking Plan, and consistent with urbanisation objectives, the aim will be to scale up clean cooking technologies (tier 4&5) to urban areas, while ensuring efficient cookstoves (tier 3, and 4) in rural areas. About 39% of households will be able to access 4&5 appliances while 61% will be able to access improved cookstoves. The goal will be to scale up to 100% clean cooking by commercial and institutional cooking (hotels, restaurants, institutional households, schools, etc.) and continue to accelerate adoption of non-biomass-based heat production (tea factories, coffee drying stations, etc....)

Pillar

### Enhance operational efficiency and drive innovation and by leveraging digitalization through integration of smart-grid transformation and automation.

3

**6. Operations & Maintenance:** Ensure optimized plant and network operations for excellent service reliability, with most economical plan.

To progressively drive efficiency and service quality, REG will aim to drive down system losses to 13.7% from the existing 18%. All SOPs will be documented, and the Company will seek certification in at least 4 systems/areas, namely in Occupational Health and Safety Management System (OHSAS), Quality Management System (QMS); Risk Management (RM) or Information Security Management System (ISMS); Environment or Energy Management System (EMS). Network reliability will continue to be at the center of operations maintenance with the aim of driving down interruptions' duration and frequency (SAIDI to 11.4 hours/year; SAIFI to 17 times/year).

**7. Digitization and Smart Grid:** Equip REG with modern IT infrastructure to maintain power grid stability and improve reliability.

For the power grid to meet desired reliability objectives and service quality, investments will be made in digitization with the aim to complete the SCADA/DMS project by 2027. Various integral application systems of the SCADA (EMS, DMS) will also be upgraded to align with the emerging demands. Other systems such as MDM and CMS will also be upgraded to improve clients' experience. The GIS geodatabase will be upgraded, and customer mapping conducted to support improve customer products service development.

**8. Research, Development, and innovation:** Conduct research on the electricity value chain to inform strategic decision and adapt to evolving energy landscapes.

A number of research initiatives in place will be developed to contribute to operations with the necessary innovations to further drive efficiency. Utilizing different existing and new partnerships to be established, a few research projects will be worked on in areas of data analytics, energy efficiency, renewable energy, smart grids; electricity markets, distributed renewable energy; as well as in operational efficiency.

Pillar

**Promote sustainable practice, Inclusive and transparent work environment.**

4

**9. Gender Mainstream:** Advance gender mainstreaming in company policies and operations.

Gender mainstreaming will continue to be at the center of REG inclusion strategy with the aim to achieve constitutional target of 30% women participation in decision making. Appropriate gender supportive frameworks will be put in place to create a safe and gender responsive environment at workplace.

**10. Corporate Governance:** Cultivate a corporate culture that prioritizes ethics and compliance with legal and regulatory requirements.

The corporate governance will play a pivotal role in delivering this strategy and upholding the highest standards of corporate governance will be the aim of REG upholding the accountability and transparency, enhancing risk management and compliance, upholding zero-tolerance towards corruption, with aspirations to maintain clean audit opinion.

**11. Communication, branding, and awareness:** Modernize stakeholders' engagement for effective service delivery, transparency and company visibility.

As a provider of electricity services, our branding and awareness will aim to raise customer perception. By aiming to increase customer perception at least 1.5% every year, we will continue to educate and share our products and services with our customers and strengthen our media relations. REG will also continue its corporate social responsibilities.

**12. Capacity Building:** Enhance staff's professional and technical capacity to support REG consistently deliver on its mission.

To meet the growing demand of the power sector, REG will continue to develop its capacities by enhancing human resources capacity (deploying staff and training) in key areas of the Company operations.

Pillar

**Enhance resource mobilisation and drive profitability through strategic revenue diversification.**

5

**13. Commercial Strategy:** To serve our customers and ensure their satisfaction through our culture of excellence.

With the aim of increasing revenue (cash) collection to 98%, we will design cost effective recovery and debt collection management strategies, work on continuously reducing commercial losses, and increase sources of revenue. REG will also work towards enhancing service delivery by further improving customer relations, revamping customer care system.

**14. Stakeholders' engagement and partnerships:** Enhance stakeholder engagements and partnerships for effective service delivery.

Achieving the strategic objectives herein can't be guaranteed, and even if it would occur, it wouldn't be efficient. Given this, REG will aim for synergies and build on existing partnerships, while aiming to forge new ones to increase achievement of the intended strategic objectives. From regional to international forums and alliances to strengthening collaboration with universities and institutions of higher learning, to increasing community participation in services such as connections, REG will seek partnerships that align with its aspirations to increase the chances of intended outcomes.

**15. Resource mobilisation:** Enhance resource and investment mobilisation to support implementation of REG strategic plan.

Implementation of REG strategic objective will require USD Mn 3,252.8. A blend of different financing instruments will be required to secure in total the above funding. These will include recurring to concessional loans to provide efficient financing to energy infrastructure expansion. An apparent need is also to venture into climate financing with opportunities to utilise different climate funds, green bonds as well as carbon credits.

This strategic plan is prepared in line with the prevailing strategic goals of the National Strategy for Transformation NST-2, aspirations of Energy Sector Strategic Plan 2024-2029, SE4All Rwanda Action Agenda and Rwanda Vision 2050 to serve as a management tool for re-assessing and re-aligning commitment of REG and its stakeholders to the ultimate objectives and inform the subsequent medium-term planning throughout 2034.

The entire Management of REG remains ready, inspired, and committed to deliver on the strategic objectives herein. At REG, we believe that everyone will find in this strategy a reason to collaborate towards the corporate mission and for this we call upon stakeholders to join us in keeping lights on for all residents and their businesses.

**Armand ZINGIRO**  
*Chief Executive Officer*  
Rwanda Energy Group

# Acknowledgment

This strategic plan was developed by REG internal team and consultations were made across all departments and units to gather information that contributed to the development of this document. The Management of REG also acknowledges the contribution of the Board of Directors and of all external stakeholders consulted through various existing consultative platforms and others organised specifically for this strategic plan, namely:

The OTP	: The Office of H.E the President of the Republic of Rwanda	RBC	: Rwanda Biomedical Centre
The PMO	: The Office of the Right Honourable Prime Minister	LODA	: Local Administrative Entities Development Agency
MININFRA	: Ministry of Infrastructure	RAB	: Rwanda Agriculture and Animal Resources Development Board
MINECOFIN	: Ministry of Finance and Economic Planning	RTDA	: Rwanda Transport Development Agency
MoE	: Ministry of Environment	RHA	: Rwanda Housing Authority
MINICOM	: Ministry of Trade and Industry	WASAC	: Water and Sanitation Corporation Ltd
MINAGRI	: Ministry of Agriculture and Animal Resources	PSF	: Private Sector Federation
MINALOC	: Ministry of Local Government	RPCL	: Rusumo Power Company Limited
MINEDUC	: Ministry of Education	RMB	: Rwanda Mines, Petroleum and Gas Board
MoH	: Ministry of Health	RAEB	: Rwanda Atomic Energy Board
RDB	: Rwanda Development Board	CoK	: City of Kigali
RURA	: Rwanda Utility Regulatory Authority	Districts	: All Districts
REMA	: Rwanda Environment Management Authority		

Other stakeholders such as in Academia and Institutions of Higher Learning, Development Partners, and Sponsors, as well as Regional (Power Pools, and sister Utility Companies) and International Partners have also been thought of and their concerns and interests gathered through different engagement forums. All together your contributions have enriched the integrated perspective of this strategy.

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# Acronyms and Abbreviations

BAUS	: Business as Usual	MV	: Medium Voltage
CAPEX	: Capital Expenditure	MW	: Megawatt
CF	: Capacity Factor	MWh	: Megawatt Hours
CIF	: Cost, Insurance & Freight	NASA	: National Aeronautics and Space Administration Agency
CoD	: Commercial Operation Date	NDCs	: Nationally Determined Contributions <sup>1</sup>
CRC	: Citizen Report Card	NEL	: Nile Equatorial Lakes
EDCL	: Energy Development Corporation Limited	NELSAP	: Nile Equatorial Lakes Subsidiary Action Programme
EDPRS	: Economic Development & Poverty Reduction Strategy	NISR	: National Institute of Statistics of Rwanda
EICV	: Integrated Household Living Conditions Survey (Enquête Intégrale sur les Conditions de Vie des Ménages)	NST-1	: National Strategy for Transformation
ESSP	: Energy Sector Strategic Plan	OPEX	: Operational Expenses
EUCL	: Energy Utility Corporation Limited	PP	: Power Plant
RWF	: Rwandan Francs	PPA	: Power Purchase Agreement
GDP	: Gross Domestic Product	REG	: Rwanda Energy Group
HPP	: Hydro Power Plant	RES	: Rwanda Energy System
HV	: High Voltage	RES	: Renewable Energy Share
IAEA	: International Atomic Energy Agency	SE4All	: Sustainable Energy for All
IEA	: International Energy Agency	SPLK	: Shema Power Lake Kivu
IPP	: Independent Power Producer	SSA	: Sub-Saharan Africa
IRENA	: International Renewable Energy Agency	T&D	: Transmission & Distribution
ITCZ	: Inter-Tropical Convergence Zone	USD	: US Dollar
km	: Kilometre		
KW	: Kilowatt		
kWh	: Kilowatt hour		
LCPDP	: Least Cost Power Development Plan		
LV	: Low Voltage		
MINECOFIN	: Ministry of Finance and Economic Planning		
MININFRA	: Ministry of Infrastructure		

<sup>1</sup> The term is contextually used to refer to the NDCs document or the underlying targets

# 1. Introduction

---

Rwanda Energy Group (REG) and its subsidiaries, Energy Development Corporation Limited (EDCL) and Energy Utility Corporation Limited (EUCL) were incorporated in 2014 as part of the Government Reform programme for the energy sector. This was aimed at consolidating gains achieved in the past couple of years in the electricity subsector, with forward-looking goals of accelerating national electrification, expanding national capacity for energy supply, improving efficiency in service delivery and attracting more financing in the sector.

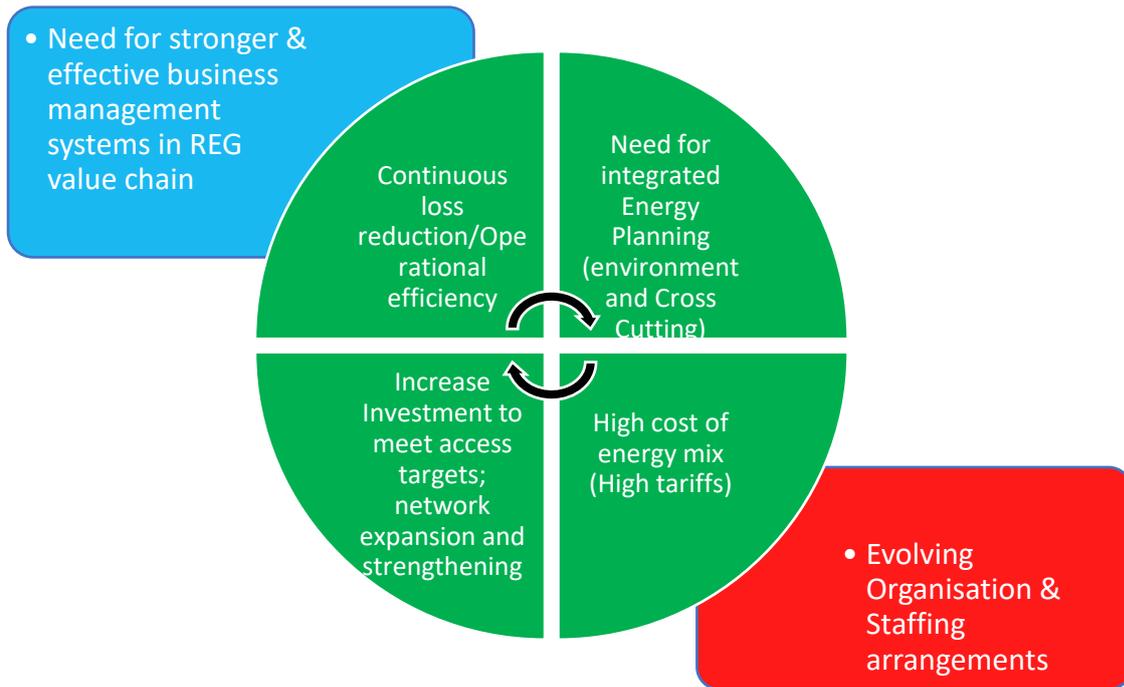
This strategy is inspired by Rwanda Vision-2050 and builds on the achievements realised during the previous strategic planning cycle of the NST-1 (2017-2024). It builds on the macroeconomic achievements of the Vision 2020, mainly in economic growth (annual growth of 7.4% throughout 2000-2022 with the corresponding GDP/capita from USD 268 to USD 1040 respectively, NISR (2024)); and poverty reduction (poverty line reduction from 59% in 2001 to 38.2% in 2017, (NISR (2018))). Building on these achievements, this strategy sets out the framework and initial targets in the energy the medium term 2035 and long-term aspirations of the Vision 2050 of improving the living standards to a middle-income country by 2035 and a high-income country by 2050.

In the following sections, we present the assessment of the industry, the competitive analysis and value proposition mapping stakeholder expectations in section 2 –, section 3 – presents the strategic framework, from the strategic statements: the corporate, vision, mission and the swot and how the Company will leverage these by working on groups of related strategic initiatives to lead to strategic objectives, which in groups of 5 pillars will hold together the framework of this strategic plan. A log-frame is presented to provide a high-level summary of the intended targets within these strategic objectives. Section 4 elaborates on the pillars, strategic objectives and underlying strategic initiatives of the strategy. Section 5 presents cross-cutting areas and emerging trends that formed the basis of a number of strategic objectives and targets in section 4. Section 6 presents the financing strategy and sensitivity analysis. Section 7 outlines the institutional coordination framework and roles as well as the implementation planning, M&E of this strategy.

## 2. Industry Assessment

### 2.1. Overview

A detailed industry evolution and performance assessment over the last 10 years has been done and this reveals that the REG strategic planning process is taking place against a background of some key institutional and sector challenges graphically illustrated in *Figure 1* below. Therefore, this strategic plan and choices made thereof clearly seek to enlist the commitment and partnerships from all REG's key stakeholders to systematically and progressively address these challenges.



*Figure 1: Key institutional and sector challenges.*

An extensive discussion is provided in section 3.2 of the SWOT analysis.

### 2.2. Competitive analysis and value proposition

#### 2.2.1. Stakeholder analysis and value proposition

An assessment of the key REG's stakeholders has been conducted to determine what the key expectations and aspirations are from thereof and thus determine the appropriate REG Response for each key aspect.

REG has diverse stakeholders with different interests and influence on REG and its operations. This summary concentrates on the major stakeholders with significant interest and influence.

*Table 1: Stakeholder analysis, expectations, and REG response*

Stakeholder	Expectation/Aspirations	REG Response
<b>Government of Rwanda and RURA</b>	Adequate Supply to meet growing National Demand	<ul style="list-style-type: none"> <li>✓ Expand generation from lower cost sources.</li> <li>✓ Effective regional engagement for supply security and favourable Power trade terms</li> <li>✓ Effective Demand forecasting</li> </ul>

Stakeholder	Expectation/Aspirations	REG Response
	Affordable Electricity Supply and reduce subsidy.	<ul style="list-style-type: none"> <li>✓ Develop Least Cost Power Development plan.</li> <li>✓ Implement loss reduction strategies.</li> <li>✓ Operate with improving cost efficiency</li> </ul>
	High Quality and Supply Reliability	<ul style="list-style-type: none"> <li>✓ Adhere to Grid Code and established Utility best practice.</li> <li>✓ Implement effective plant and network development &amp; maintenance practices</li> </ul>
	Transparency and Accountability	<ul style="list-style-type: none"> <li>✓ Prepare Timely and comprehensive reports.</li> <li>✓ Establish reliable reporting systems.</li> <li>✓ Adopt International Reporting Standards</li> <li>✓ Maintain Clean Audits</li> </ul>
	Attract Investment in the sector.	<ul style="list-style-type: none"> <li>✓ Facilitate private sector participation.</li> <li>✓ Fulfil commitments for Power supply.</li> <li>✓ Ensure network reliability to optimize system availability</li> </ul>
<b>Independent Power Producers (IPPs)</b>	Reliable network for continuous energy off-take	<ul style="list-style-type: none"> <li>✓ Undertake timely investment &amp; maintenance of Network.</li> <li>✓ Ensure efficient System Operation</li> </ul>
	Timely payment of supply invoices as per PPA terms	<ul style="list-style-type: none"> <li>✓ Ensure sufficient revenue generation.</li> <li>✓ Proper cash flow planning</li> <li>✓ Ensure systematic cost control</li> </ul>
<b>Consumers</b>	Affordable Power Tariffs	<ul style="list-style-type: none"> <li>✓ Implement loss reduction strategies.</li> <li>✓ Operate with improving cost efficiency.</li> <li>✓ Negotiate lower cost PPAs.</li> <li>✓ Develop cheaper alternative sources of supply</li> </ul>
	High Quality, Safe and Reliable Service	<ul style="list-style-type: none"> <li>✓ Adhere to Grid Code and established Utility best practice.</li> <li>✓ Effective plant/network development &amp; maintenance</li> </ul>
	Responsive Customer Service	<ul style="list-style-type: none"> <li>✓ Accurate, timely billing and collection</li> <li>✓ Regular Customer engagement</li> <li>✓ Effective customer communication and awareness programmes</li> <li>✓ Modernize customer management systems</li> </ul>
<b>Development Partners</b>	Shared development agenda	<ul style="list-style-type: none"> <li>✓ Effective stakeholder engagement</li> <li>✓ Regular Consultation</li> <li>✓ Share sector investment and development plans</li> </ul>
	Transparency and Accountability	<ul style="list-style-type: none"> <li>✓ Prepare timely and comprehensive reports.</li> <li>✓ Establish reliable reporting systems.</li> <li>✓ Adopt International Reporting Standards</li> <li>✓ Maintain Clean Audits</li> </ul>
<b>REG Staff &amp; Outsourced Manpower services</b>	Enabling Reward & Other Organizational Policies	<ul style="list-style-type: none"> <li>✓ Enhance Organizational Policies</li> <li>✓ Put in place a competitive reward scheme.</li> <li>✓ Implement an effective performance management system</li> </ul>
	Training & Development Opportunities	<ul style="list-style-type: none"> <li>✓ Create Job enrichment and rotation practices.</li> </ul>

Stakeholder	Expectation/Aspirations	REG Response
Academia		<ul style="list-style-type: none"> <li>✓ Develop and implement a comprehensive capacity building plan</li> </ul>
	Provision of adequate tools and equipment	<ul style="list-style-type: none"> <li>✓ Invest in modern systems and procedures.</li> <li>✓ Provide the required facilities, tools and equipment</li> </ul>
	Collaboration in Research and Development (R&D):	<ul style="list-style-type: none"> <li>✓ Forge cooperation and partnerships in conducting research in the fields of electrical engineering, renewable energy, power generation, and energy efficiency.</li> </ul>
	Innovation, knowledge, and technology transfer.	<ul style="list-style-type: none"> <li>✓ REG openness to benefit from relevant outputs from innovation hubs,</li> <li>✓ Collaborate and facilitate testing and application of potential innovations to enhance REG 's operations, products, and services.</li> </ul>
	Workforce Development	<ul style="list-style-type: none"> <li>✓ REG seeks to recruit well-trained professionals, including technicians, engineers, economists, environmental scientists, and policy experts.</li> <li>✓ REG provides apprenticeship opportunities to students to practice necessary skills and apply theoretical knowledge.</li> </ul>

## 2.2.2. Competitive analysis

### REG through Potter's 5-Forces

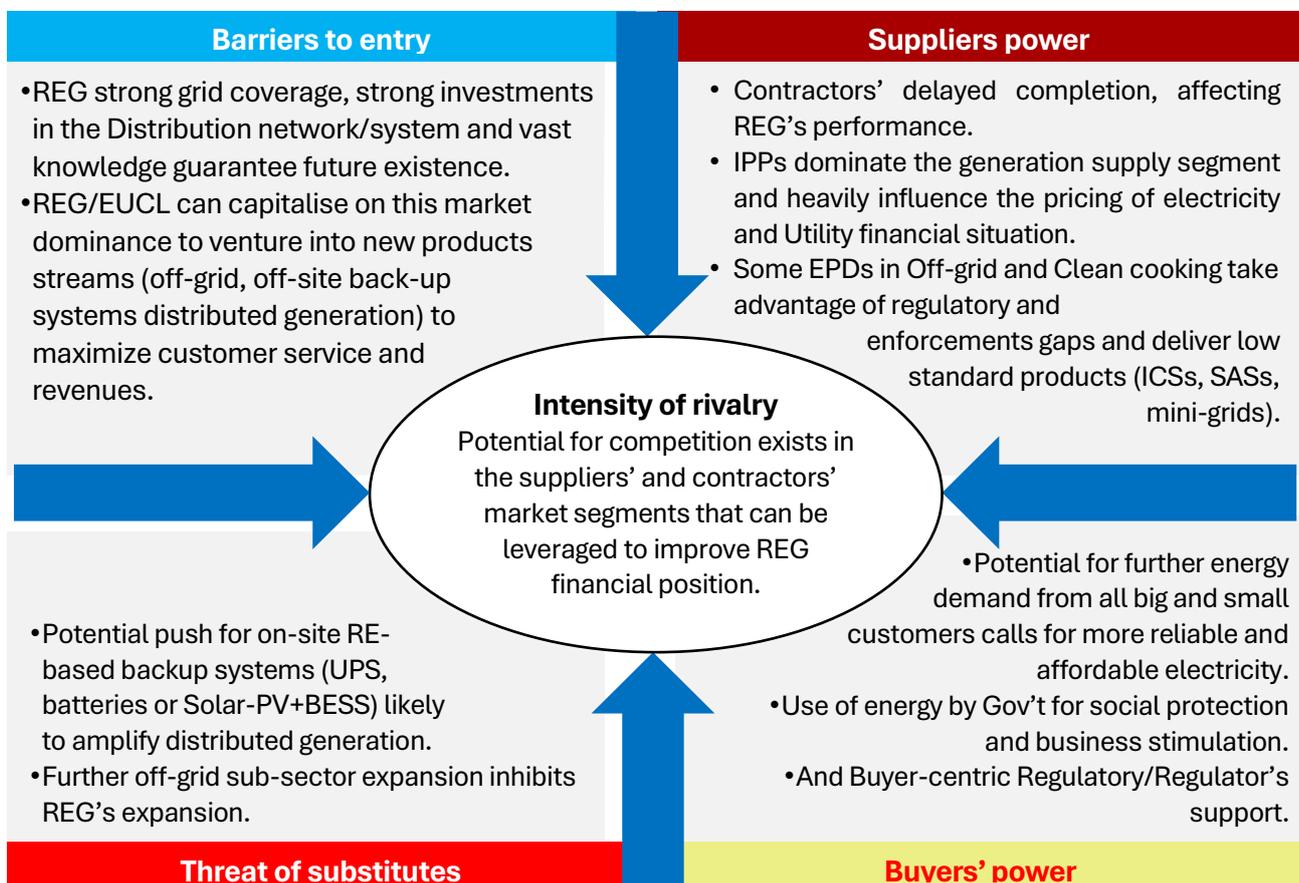


Figure 2: REG through Potter's 5-Forces

## 3. Strategic Framework

### 3.1. Corporate Strategic Statements

#### Vision

*To be the Leading Regional Provider of Innovative and Sustainable Energy Solutions for National Development*

#### Mission

*Developing and Providing Reliable and Affordable Energy while Creating Value for Our Stakeholders*

#### Core Values



### 3.2. REG SWOT Analysis

Drawing from an industry development and performance analysis coupled with a review of the REG's stakeholder mapping process, the next stage is to conduct a detailed Strengths-Weaknesses-Opportunities-Threats (SWOT) Analysis. This has enables REG to consider how to build on and maximize the advantage presented by the strengths and opportunities while at the same time, address the weakness and adequately respond to the identified threats. The confluence of these provides a good basis for REG to establish its strategic stand, determine appropriate strategic objectives and the necessary initiatives achieve them.

Table 2: SWOT Analysis

SWOT Aspect	Strategic Implications	
STRENGTHS	Advantage	REG Response
<ul style="list-style-type: none"> <li>Increasing Investment in the Network</li> <li>Lower cost Base Load plants in generation to mix.</li> <li>Young and Qualified Staff</li> </ul>	<ul style="list-style-type: none"> <li>Increased capacity to improve service reliability</li> <li>Optimize plants to reduce cost.</li> </ul>	<ul style="list-style-type: none"> <li>Mobilize resources and execute planned projects.</li> <li>Implement refurbishment and maintenance schedules.</li> </ul>

SWOT Aspect	Strategic Implications	
<b>STRENGTHS</b>	<b>Advantage</b>	<b>REG Response</b>
<ul style="list-style-type: none"> <li>▪ Focused mandate for Development and Utility</li> <li>▪ Increased Investment in modern Business Management systems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Good foundation for building a professional team.</li> <li>▪ Potential for achieving operational excellence</li> </ul>	<ul style="list-style-type: none"> <li>▪ Develop and implement comprehensive capacity building programme.</li> <li>▪ Prioritize recruitment for key functions.</li> <li>▪ Enforce usage of new systems</li> </ul>
<b>Opportunities</b>	<b>Advantage</b>	<b>REG Response</b>
<ul style="list-style-type: none"> <li>▪ Potential to develop new low-cost generation plants.</li> <li>▪ Potential to Increase access through both grid and off-grid solutions.</li> <li>▪ Cheaper imports from the region</li> <li>▪ Enabling Govt. policy and strategy</li> <li>▪ Support from Devt. Partners</li> <li>▪ High investor interest in generation</li> </ul>	<ul style="list-style-type: none"> <li>▪ REG can invest in generation to lower cost of generation mix.</li> <li>▪ Two-pronged strategy to achieve Access targets.</li> <li>▪ Mitigate interim supply gaps &amp; reduce tariff.</li> <li>▪ GoR support for this plan assured.</li> <li>▪ Source of grants and low-cost investible funds</li> <li>▪ Scope for JVs and SPVs.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify and develop priority projects</li> <li>▪ Establish basis for determination of grid and off-grid interventions</li> <li>▪ Update access plans</li> <li>▪ Mobilize resources for access projects</li> <li>▪ Advocate for timely power import deals guided by least cost generation plan</li> <li>▪ Share generation and network development plans to mobilize investments</li> </ul>
<b>Threats</b>	<b>Challenges/Risks</b>	<b>REG Response</b>
<ul style="list-style-type: none"> <li>▪ Foreign currency-based PPAs on Take or Pay basis</li> <li>▪ Relatively High Tariffs constraining demand.</li> <li>▪ New generation dominated by high cost private capital.</li> <li>▪ Delays in completion of regional projects distorting planning</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increasing cost of service</li> <li>▪ Difficulty in optimizing capacity and facilities.</li> <li>▪ High end-user tariffs</li> <li>▪ Costly emergency solutions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Propose favorable standard PPAs.</li> <li>▪ Equip a specialized PPA Team</li> <li>▪ Advocate for targeted tariffs.</li> <li>▪ Mobilize concessional investment in generation.</li> <li>▪ Ensure effective project management.</li> <li>▪ Effectively engage regional counterparts</li> </ul>
<b>Weaknesses</b>	<b>Challenges/Risks</b>	<b>REG Response</b>
<ul style="list-style-type: none"> <li>▪ Need to streamline sector planning</li> <li>▪ Relatively High cost energy mix</li> <li>▪ Inadequate funds for investment</li> <li>▪ Evolving structures &amp; systems for operational and financial control</li> <li>▪ Unfavourable PPA conditions to the Utility</li> </ul>	<ul style="list-style-type: none"> <li>▪ Prospects of supply disruption</li> <li>▪ Constraints for universal access and high tariffs</li> <li>▪ Inefficiency in operations and limited value-for-money</li> <li>▪ Lost productivity through sub-optimal performance</li> </ul>	<ul style="list-style-type: none"> <li>▪ Advocate for REG's central role for generation and network planning</li> <li>▪ Dilute the cost of energy mix with lower cost generation</li> <li>▪ Engage for mobilization on lower cost investible funds/projects</li> <li>▪ Advocate for standard and appropriately risk balanced PPAs</li> <li>▪ Establish systems for organizational performance management</li> </ul>

Weaknesses	Challenges/Risks	REG Response
<ul style="list-style-type: none"> <li>▪ Unoptimized performance management system</li> <li>▪ Old and constrained transmission and distribution</li> <li>▪ Slow adoption of/and systematic adherence to utility best practices and standards</li> <li>▪ Inadequate specialized skills esp. Planning, PPAs, Finance, Project Management, Utility Operations</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low utility service reliability</li> <li>▪ Low quality of supply and high safety risks</li> <li>▪ Risk to a sustained execution of institutional mandate and financial sustainability reform</li> </ul>	<ul style="list-style-type: none"> <li>▪ Streamline network development and maintenance procedures</li> <li>▪ Resource and train staff for specialized skills development</li> </ul>

### 3.3. Pillars and Strategic Objectives

REG’s overall goal “Achieve universal electrification for industry and household usage based on a sustainable and affordable tariff”. In the horizon 2024-2034, the corporate strategy is anchored on the following 5 pillars covering 15 strategic objectives:

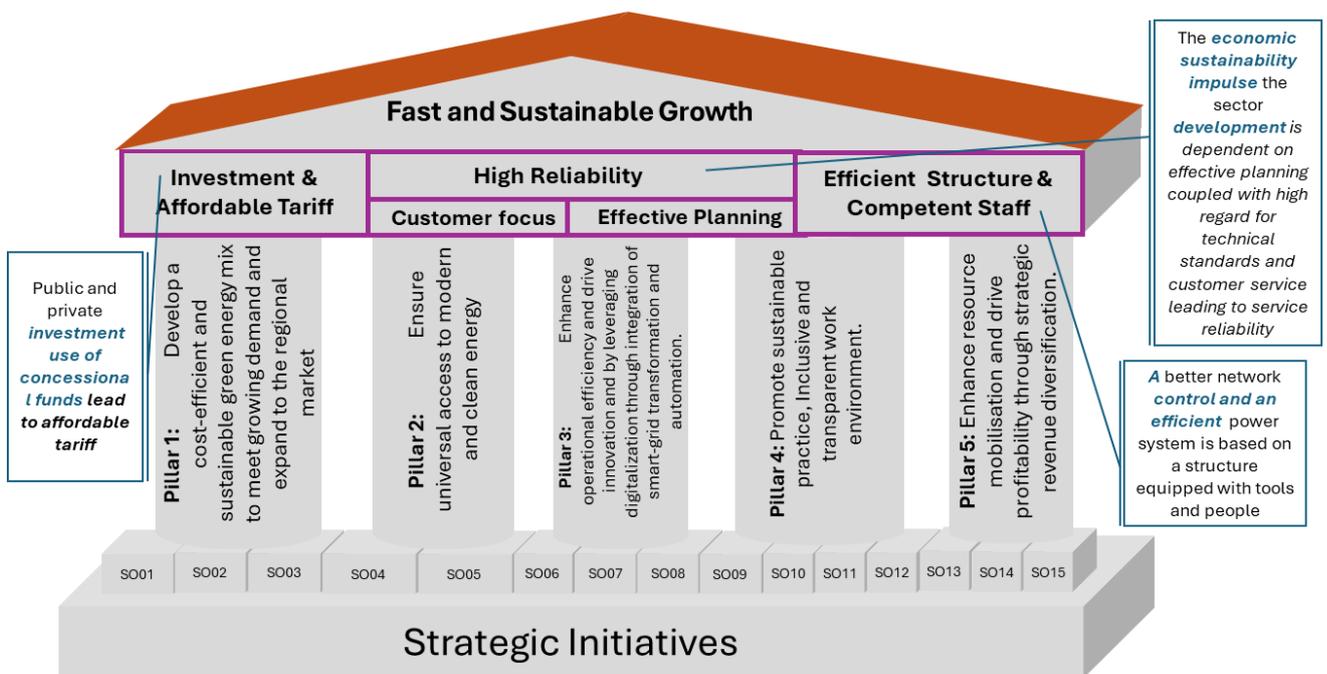


Figure 3: REG strategic framework

#### Strategic Objectives

A Governance structure is in place to ensure that REG structure and resources are enhanced to deliver this plan underpinned by REG’s core values.

#### Pillar 1: Develop a cost-efficient and sustainable green energy mix to meet growing demand and expand to the regional market.

1. **Generation** - Build a balanced and cost optimized generation mix sufficient to meet the growing demand.
2. **Transmission & Distribution** - Plan, build and operate transmission and distribution infrastructure to ensure timely alignment of current and future

generation with national demand, enhance utility efficiency and reliability of power supply.

3. **Tariff Evolution** - Develop a clear tariff trajectory with clear milestones based on effective engagement with IPPs, financiers and other stakeholders to achieve affordable tariff.

**Pillar 2: Ensure universal access to modern and clean energy.**

4. **Electricity Access**- Achieve 100% national access to electricity driven based on grid and off-grid solutions.
5. **Access to modern and efficient cooking technologies** Scale up use of efficient cooking technologies, increase adoption of clean cooking solutions and achieve full adoption of clean and efficient cooking technologies and heat production by institutional and commercial entities.

**Pillar 3: Enhance operational efficiency and drive innovation and by leveraging digitalization through integration of smart-grid transformation and automation.**

6. **Operations & Maintenance** - Ensure optimized plant and network operations for excellent service reliability, with most economical plan.
7. **Digitization and Smart Grid** – Equip REG with modern IT infrastructure to maintain power grid stability and improve reliability.
8. **Research, Development, and innovation:** Conduct research on the electricity value chain to inform strategic decision and adapt to evolving energy landscapes.

**Pillar 4: Promote sustainable practice, Inclusive and transparent work environment.**

9. **Gender Mainstream** – Advance gender mainstreaming in company policies and operations.
10. **Corporate Governance** - Cultivate a corporate culture that prioritizes ethics and compliance with legal and regulatory requirements.
11. **Communication, branding and awareness** - Modernize stakeholders' engagement for effective service delivery, transparency and company visibility.
12. **Capacity Building** - Enhance staff's professional and technical capacity to support REG consistently deliver on its mission.

**Pillar 4: Enhance resource mobilisation and drive profitability through strategic revenue diversification.**

13. **Commercial Strategy** - To serve our customers and ensure their satisfaction through our culture of excellence.
14. **Stakeholders' engagement and partnerships**– Boost stakeholders' engagement and partnerships for effective service delivery.
15. **Resource mobilisation:** - Enhance resource and investment mobilisation to support implementation of REG strategic plan.

### 3.4. Logical framework

Pillars	Strategic Objectives	Indicator	Baseline	Target	MoV <sup>2</sup>	Assumption
1. Develop a cost-efficient and sustainable green energy mix to meet growing demand and expand to the regional market.	Build a balanced and cost optimized generation mix sufficient to meet the growing demand.	Increased installed capacity to meet the demand	406 MW	1066 MW	Annual reports	<ul style="list-style-type: none"> <li>Least Cost Generation Investment upheld</li> </ul>
		Renewable Energy Share	56%	60%		
		Reserve margin	20%	15%		
		Generation Plants availability	97%	98%		
	Plan, build and operate transmission and distribution infrastructure to ensure timely alignment of current and future generation with national demand, enhance utility efficiency and reliability of power supply.	Transmission network length	1,158 km	1709.8 km	Annual Reports	<ul style="list-style-type: none"> <li>Demand growth to drive infrastructure expansion.</li> <li>Timely program &amp; project implementation</li> </ul>
		% transmission network availability	96%	97%		
		MV network length	11,389 km	13,168 km		
		LV network length	21,084 km	24,810 km		
	Develop a clear tariff trajectory with clear milestones based on effective engagement with IPPs, financiers and other stakeholders to achieve affordable tariff.	% increase in the tariff is less than GDP per capita growth.	% increase in tariff < % increase in GDP per capita	% increase in tariff < % increase in GDP per capita	Annual reports	<ul style="list-style-type: none"> <li>Cost-reflective tariff meeting Utility Revenue requirements is applied</li> </ul>
	2. Ensure universal access to modern and clean energy	Achieve 100% national access to electricity driven based on grid and off-grid solutions.	% of HHs with access to electricity	78.9%	100%	EICV Survey; Annual Reports
% of HHs with access to grid electricity			55.9%	75%		
% of HHs with access to off-grid electricity			23.0%	25%		
% of productive users with access to electricity			86%	100%		
Scale up use of efficient cooking technologies, increase adoption of clean cooking solutions and achieve full adoption of clean and efficient cooking technologies and heat production by institutional and commercial entities.		# of HHs with tier 4&5 cookstoves (Electric & LPG)	4.6%	39%	EICV Survey; Annual Reports	
		# of HHs with improved cookstoves	31.7%	61%		
		Percentage of large scale-users using efficient and		100%		

<sup>2</sup> MoV: Means of Verification

Pillars	Strategic Objectives	Indicator	Baseline	Target	MoV <sup>2</sup>	Assumption
		clean cooking technologies and heat production				
<b>3. Enhance operational efficiency and drive innovation and by leveraging digitalization through integration of smart-grid transformation and automation</b>	Ensure optimized plant and network operations for excellent service reliability, with most economical plan.	System losses	18%	13.7%	Annual report	<ul style="list-style-type: none"> <li>Investment availability for network strengthening projects.</li> <li>Coordinated and coherent grid electrification (universal access)</li> </ul>
		% of well documented Standard operating Procedure (SoP)	70%	100%		
		# of ISO certifications	0	At least 4 (OHSAS, QMS; Risk Management; Environment; Energy Management; Information Security Management)		
		SAIDI	14.9	11.4		
		SAIFI	21	17.4		
	Equip REG with modern IT infrastructure to maintain power grid stability and improve reliability.	Implementation progress of SCADA/DMS Project	33.5%	100%	Annual reports	<ul style="list-style-type: none"> <li>Adequate investments in digitization and smart grid</li> <li>System interoperability</li> </ul>
		GIS system and customer mapping	Contract signed	Updated GIS geodatabase and customer mapping		
# of upgraded software application systems		Existing (EMS, DMS, MDM, CMS)	4 (EMS, DMS, MDM, CMS)			
Conduct research on the electricity value chain to inform strategic decision and adapt to evolving energy landscapes.	# new initiatives or projects informed by research findings	2	7	Annual Reports	<ul style="list-style-type: none"> <li>Synergies in R&amp;D</li> <li>Positive perspective to innovation adoption</li> </ul>	
<b>4. Promote sustainable practice, Inclusive and</b>	Advance gender mainstreaming in company policies and operations.	% of women in leadership positions	22%	30%	Annual Reports	<ul style="list-style-type: none"> <li>Continued support to Gender mainstreaming</li> </ul>
		% of women in employment	22.8%	30%		
	Cultivate a corporate culture that prioritizes ethics and compliance with legal and regulatory requirements.	audit opinion	Clean audit	Clean audit	Annual reports	<ul style="list-style-type: none"> <li>Stakeholders' support to corporate governance reform and financial sustainability</li> </ul>

Pillars	Strategic Objectives	Indicator	Baseline	Target	MoV <sup>2</sup>	Assumption
transparent work environment	Achieve and maintain a profit margin of over 5% by Year 3	EBITDA margin	-15.29%	5%	Annual Reports	<ul style="list-style-type: none"> <li>Achieve financial autonomy of EUCL &amp; EDCL</li> <li>Readiness framework for EUCL's stock market listing developed in time to allow listing by 2031</li> </ul>
	Modernize stakeholders' engagement for effective service delivery, transparency, and company visibility.	% annual increase in customer perception	1.5%	1.5%	Annual Reports	<ul style="list-style-type: none"> <li>Branding reinforced</li> <li>Awareness efforts supported.</li> <li>Innovative &amp; efficient outreach means deployed</li> </ul>
	Enhance staff's professional and technical capacity to support REG consistently deliver on its mission.	vacancy rate (per approved organization structure)	20%	10%	Annual report	<ul style="list-style-type: none"> <li>Capacity Need Assessment</li> <li>Adequate Investments towards capacity building</li> </ul>
		% implementation progress of the capacity building plan	80%	80%		
5. Enhance resource mobilisation and drive profitability through strategic revenue diversification	To serve our customers and ensure their satisfaction through our culture of excellence.	% of revenue collection	95%	98%	Annual reports	<ul style="list-style-type: none"> <li>High electricity demand growth</li> <li>Major electricity loads materialise as planned</li> </ul>
	Boost stakeholders' engagement and partnerships for effective service delivery	# of revenue generating partnerships established	1 (ZESA)	At least 3 partnerships established	Annual reports	<ul style="list-style-type: none"> <li>Streamlined internal operations.</li> <li>Financial autonomy to benefit REG</li> </ul>
	Enhance resource and investment mobilisation to support implementation of REG strategic plan.	Funds secured to support implementation of REG strategic plan	USD M 907.69 (RUEAP, ASCENT, Korea EXIM Bank, etc.)	Mobilise USD M 3,252.8	Annual Reports	<ul style="list-style-type: none"> <li>Shareholder support in investment mobilisation</li> </ul>

## 4. Detailed Pillars, Strategic Objectives, and Initiatives

### 4.1. Pillar 1: Develop a cost-efficient and sustainable green energy mix to meet growing demand and expand to the regional market.

#### 4.1.1. Generation:

Strategic Objective (SO1)- **Build a Balanced and Cost Optimized Generation Mix sufficient to meet Growing Demand.**

#### Rationale

This objective is aimed to address the key challenges:

- a) Overriding National objective is to ensure sufficient and reliable energy supply to attract investment and support social transformation.
- b) Targets installed capacity of ensuring a reliable generation supply capable of meeting demand with a 15 % reserve margin to align with National growth targets – thus the need to ensure a balance between energy security and cost.
- c) Generation costs accounts for over 80% of the total cost of service.
- d) Other generation focused challenges include:
  - Resolving a mismatch between demand and supply leading to load-shedding or capacity under-utilization (costly surplus).
  - Tackling the high-cost energy mix –urgent need for cost dilution.
  - Inflexible PPAs (take-or-pay) terms- need for flexible PPAs.
  - Reducing the contribution of commercial finance in generation projects – thus the need for concessional funds lower end-user tariffs.
  - The need to increase the share of Renewable sources in the energy mix.

REG has conducted a generations expansion resource study to take stock of the resource potential and identified technically exploitable capacity to guide generation expansion planning. In addition, since 2019, REG developed a detailed Least Cost Development Plan (LCPDP)<sup>3</sup> that has an in-depth analysis of the demand forecast and the current generation status and alignment of generation pipeline with the candidate projects to be developed over this planning period. The targets have been formulated based on the targets and priorities in the National Strategy for Transformation (NST-2), Energy Sector Strategic Plan 2024-2029, SE4All Rwanda Action Agenda, COP28 Presidential Pledges, and long-term national, regional, and continental aspirations (Rwanda Vision 2050, EAC Vision 2050, AU Agenda 2063) and they are designed to be met under the different expansion scenarios and are regularly updated in the Rwanda LCPDP and demand forecasts and form the basis for power development plans.

The generation assumptions and details herein are extracts from that detailed plan.

<sup>3</sup> The LCPDP along other power development plans are periodically reviewed to align with the system dynamics and guide appropriate investment options to optimise electricity supply and demand.

## Historical & Planned Electricity Demand

- The average electricity demand growth has been on average below 10% in the past 25 years.
- The historical base case of electricity demand growth is at 10% going forward as it is aligned to the growth in the recent years, i.e., reference case for demand growth.
- We need high demand growth to meet the electrification and corporate business objectives.
- REG needs support by all stakeholders in demand creation to meet the 12% annual demand growth.

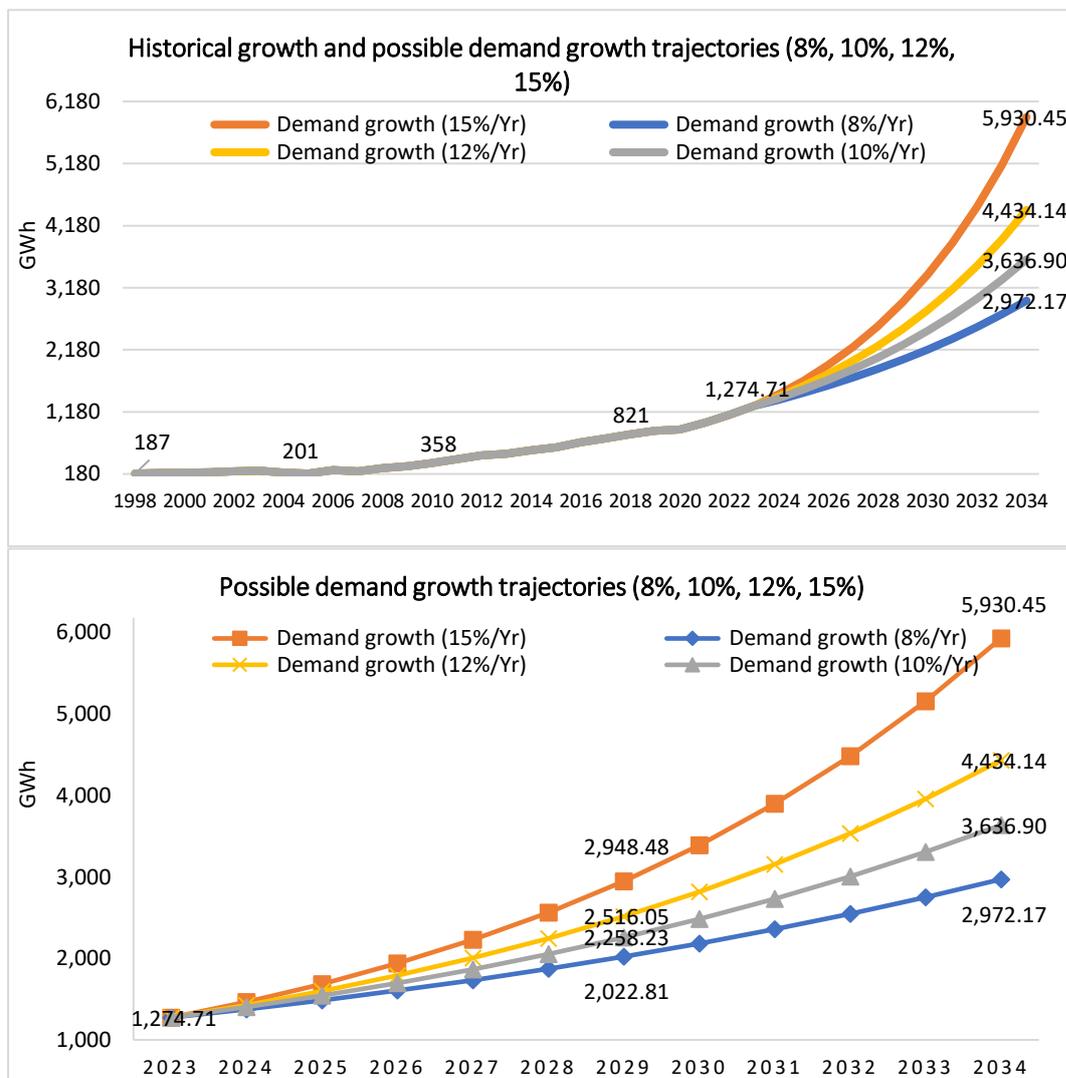


Figure 4: Historical, and projections demand growth projections of electricity demand.

## Generation Assumptions

- The National Strategic Case scenario in the generation plan seeks to align the REG strategic plan with the national objectives in the NST-2 and the Rwanda Vision 2050.
- This is premised on an annual demand growth of 15% driving the need for increased generation capacity. This demand is anticipated from Government’s accelerated programme in the promotion of industry, commercial and other service activities.
- An alternative case is modelled at an annual growth rate of 12 % (which is consistent with the historical electricity demand growth rate of 8.36% for the period 1998-2024, with a 12.4% average annual growth for the post-pandemic recovery period “2021 throughout 2023”) to reflect the impact if demand grows consistent with the post-pandemic economic recovery and medium-term energy efficiency scenario.

Table 3: Generation Outlook – Key Inputs and Targets

	Unit	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034
Peak Demand + losses - Historical GDP growth case	MW	228	251	276	304	334	368	404	445	489	538	592
Peak Demand + losses - Operational & Demand case	MW	228	256	286	321	359	402	450	504	565	633	709
Peak Demand + losses - Strategic case	MW	228	262	302	347	399	459	528	607	698	803	923
Peak demand + 15% reserve margin (Historical growth of 10% growth)	MW	262	289	318	349	384	423	465	511	563	619	681
Peak demand + 15% reserve margin (National Case 12% growth)	MW	262	294	329	369	413	462	518	580	650	728	815
Peak demand + 15% reserve margin (National Case 12% growth)	MW	262	302	347	399	459	528	607	698	803	923	1,062
<b>Demand difference (Operational-to-Historical case without 15% reserve margin)</b>	<b>MW</b>	<b>-</b>	<b>5</b>	<b>10</b>	<b>17</b>	<b>25</b>	<b>35</b>	<b>46</b>	<b>60</b>	<b>76</b>	<b>95</b>	<b>117</b>
<b>Demand difference (Strategic-to-Historical case without 15% reserve margin)</b>	<b>MW</b>	<b>-</b>	<b>11</b>	<b>26</b>	<b>43</b>	<b>65</b>	<b>91</b>	<b>124</b>	<b>162</b>	<b>209</b>	<b>265</b>	<b>331</b>
Historical growth rate	%	0%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Operational growth rate	%	0%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Strategic case growth rate	%	0%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Electricity demand growth - Historical/GDP/Base case	GWh	1,366.4	1,503.0	1,653.3	1,818.7	2,000.5	2,200.6	2,420.6	2,662.7	2,929.0	3,221.9	3,544.1
Electricity demand at operational demand case 12% annual growth	GWh	1,366.4	1,530.4	1,714.0	1,919.7	2,150.0	2,408.1	2,697.0	3,020.7	3,383.1	3,789.1	4,243.8
Electricity demand in Strategic case sustained 15% annual growth	GWh	1,366.4	1,571.4	1,807.1	2,078.1	2,389.8	2,748.3	3,160.6	3,634.6	4,179.8	4,806.8	5,527.8
Required electricity demand operational/demand growth (12%)	GWh	-	27	61	101	150	207	276	358	454	567	700
Required electricity demand strategic growth (15%)	GWh	-	68	154	259	389	548	740	972	1,251	1,585	1,984
Average generation tariff - Base case	USD/kWh	0.151	0.142	0.138	0.135	0.133	0.132	0.131	0.131	0.132	0.132	0.132
Average generation tariff - Operational & Demand Growth Case	USD/kWh	0.151	0.142	0.138	0.135	0.133	0.132	0.131	0.131	0.132	0.132	0.132
Average generation tariff - Strategic	USD/kWh	0.151	0.142	0.138	0.135	0.133	0.132	0.131	0.131	0.132	0.132	0.132
Total generation cost - Historical Base case (Utility)	Millions' USD	159.85	179.89	213.58	238.55	253.83	261.37	284.38	329.20	372.17	413.34	434.18
Total generation cost - Operational Demand	Millions' USD	160.01	180.19	213.89	220.11	217.85	225.44	248.42	293.23	355.26	414.44	435.28
Total generation cost - Strategic	Millions' USD	160.01	180.19	213.89	220.11	229.10	258.50	303.75	364.92	401.15	462.43	512.75

	Unit	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034
Total installed capacity - Historical GDP Growth Case	MW	406	410	482	497	591	641	709	709	826	872	954
Total installed capacity - Operational & Demand Growth Case	MW	406	410	482	567	691	771	782	850	870	1,006	1,066
Total installed capacity - National Strategic Case	MW	406	410	482	587	711	791	802	900	976	1,156	1,216
Subsidies - Historical GDP Growth Case	Frw Billions	-	67	60	93	106	109	91	140	197	276	372
Subsidies - Operational & Demand Growth Case	Frw Billions	-	67	46	72	18	5	-	-	20	139	195
Subsidies - Strategic case	Frw Billions	-	67	24	37	-	-	-	-	-	-	29
<b>Operational-to-Base Case reserve</b>	<b>MW</b>	-	-	-	<b>70</b>	<b>100</b>	<b>130</b>	<b>73</b>	<b>141</b>	<b>44</b>	<b>134</b>	<b>112</b>
<b>Strategic-to-Base Case reserve</b>	<b>MW</b>	-	-	-	<b>90</b>	<b>120</b>	<b>150</b>	<b>93</b>	<b>191</b>	<b>150</b>	<b>284</b>	<b>262</b>

### Base Case Peak Demand and Capacity Outlook

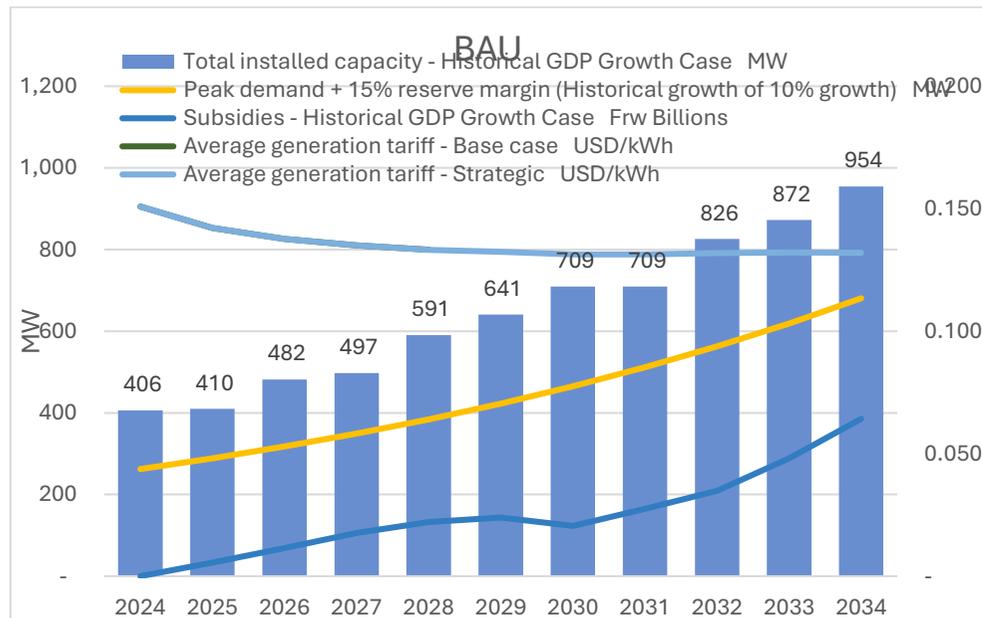


Figure 5: Base case peak demand and capacity outlook

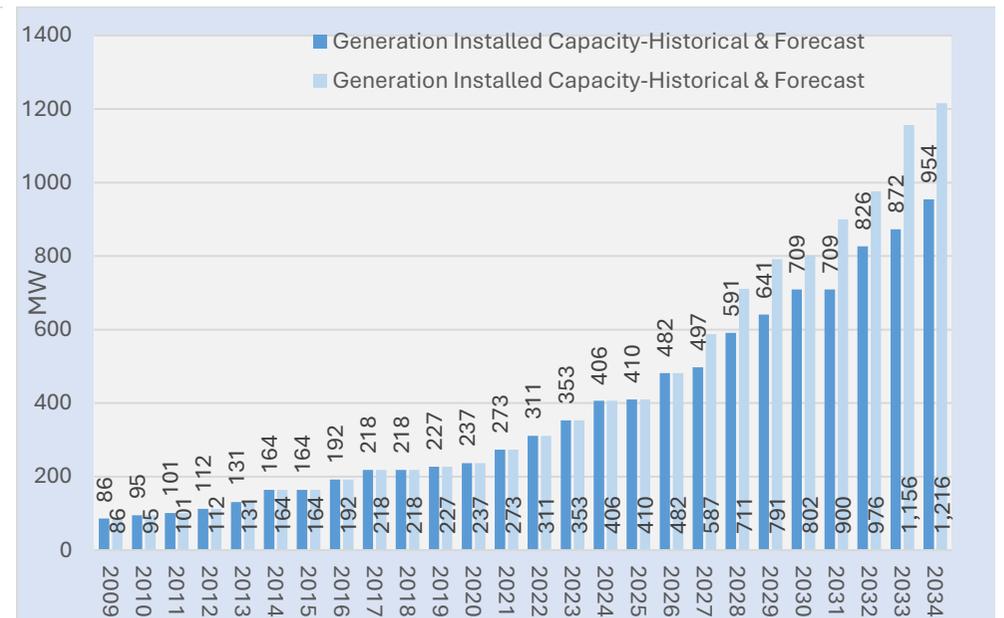


Figure 6: Cumulative installed capacity from 2009 to 2034 current accounts and projections based on demand growth and 15% reserve margin requirement.

### National Strategic Case Analysed

- At an annual demand growth rate of 10%, the required installed generation capacity would need to grow to 641 MW and 954 MW in 2029 and 2034 respectively. A 2% sensitivity analysis on annual demand growth would translate into 771MW and 1066 MW of capacity requirements by 2029 and 2034 respectively. The extreme 5% sensitivity analysis translates into 791MW and 1216 MW by 2034. In high growth scenarios, system availability load factor increases as a result of system optimisation.
- Based on current planned generation sources, the average generation tariff will be lowest in 2029-2030 at 131 US\$ ¢/kWh from the current to 141 US\$ ¢/kWh but will rise to 132 US\$ ¢/kWh in 2032 throughout 2034.
- For the period up to 2028/2029, the cost of generation rises steadily, although diluted in 2027 by commissioning of Nyabarongo II and other cheaper sources of generation (imports and solar PV) thus the need for more additional funding to support generating expansion capacity in high growth.
- In 2026-2029, with sustained 15% annual demand growth, the additional funding slightly increases due needed growth in increasing generation capacity but remains relatively the lowest in all 3 scenarios.

### GDP Growth Rate Case I and Base Case Growth Analysed

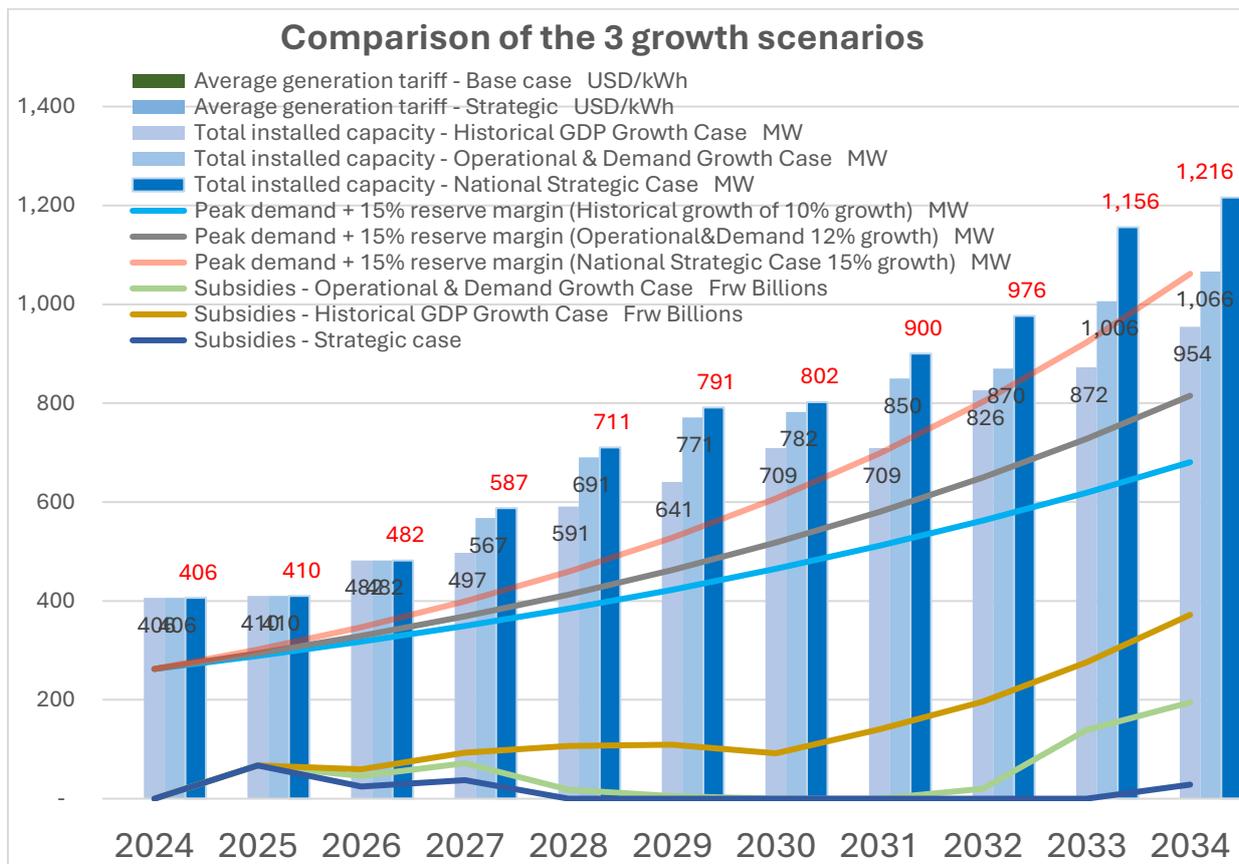


Figure 7: Peak demand growth (historical and national/strategic) and installed capacity.

- **If the 12% demand growth rate is not achieved, and the historical growth rates are sustained, excess capacity will result into a hike in tariff or subsidy requirements for the excess power generated in that case.**

In light of the foregoing analysis, REG will pursue a strategy of working with other key stakeholders and especially Government Agencies/Entities and IPPs to develop generation supply capacity to achieve the targeted growth of at least 12% with subsidy support as outlined in the medium term to 2029.

The Key strategic initiatives to building a balanced and cost optimized generation mix sufficient to meet growing demand are outlined here below:

### **Strategic Initiatives**

- a) Increase generation capacity to meet the demand and maintain 15% reserve margins in line with the generation expansion plan.
- b) Develop and regularly update a comprehensive generation plan based on least cost principles based on Demand Forecasts with appropriate spinning capacity.
- c) Mobilize grants and concessional funds to invest in generation projects and adopt a strategy to dilute the cost of power supply.
- d) Undertake technical studies (Hydrogen production; Distributed Renewable Energy Sources; Solar PV with BESS storage; Hydro Pumped Storage; Exploratory studies for geothermal resources) aimed at increasing the share of Renewable energy in the energy mix and pave way for open competitive procurement.
- e) Foster regional power exchange and integrate into regional power pools.
- f) Optimise the generating capacity of power plants.
- g) Equip priority power plants with black start capabilities and automated generation control (AGC).
- h) Develop and implement demand side management to optimise energy consumption.

## 4.1.2. Transmission and Distribution

Strategic Objective (SO2) – **Plan, build and operate transmission and distribution infrastructure to ensure timely alignment of current and future generation with national demand, enhance utility efficiency and reliability of power supply.**

### Rationale

To enable efficient evacuation of energy from generation plants from south-west and other regions to growing load centres countrywide. Several studies have been conducted to guide development of the high voltage network expansion:

- Network Review and Technical assessment 2013 (Manitoba Report)
- Network Planning and Design 2013 (SOFRECO Report)
- Scoping for Kigali 15KV Network Strengthening 2015 (World Bank Distribution Reports)
- Loss reduction strategy (REG/EUCL)
- Several editions of the Distribution Network Development Plan
- High Voltage Transmission Lines for Rwanda: Network Study Report (Power Africa, 2020)
- Several editions of the Transmission and Distribution Network Development Plans

Other compelling considerations include:

- New transmission lines and substations still experiencing delays,
- Interconnections are behind planned schedules,
- investments in transmission are costly and need grant and concessional funding,
- Transmission designs and implementation lacking best practice i.e., N-1 principle.
- Very long MV and LV lines leading to high losses, low reliability, and low voltages,
- Transformer and feeder overloads thus high losses and outage levels,
- Mixed voltage levels,
- High technical and commercial losses,
- Aging network facilities and need for significant investments,
- Inappropriate switching points which severely affects utility business operation in case of planned and unplanned outages.

### Strategic Initiatives

- a) Complete Southern & Western Interconnections to facilitate regional power trade among utilities.
- b) Develop and biennially update Demand Forecasts for the sector to form the basis for all new generation projects.
- c) Regular update of economic power dispatch procedures.
- d) Implement and update standard network construction and maintenance procedures in line with Grid/Quality of service code to ensure consistency in quality and reliability of Supply.

- e) Plan and build transmission lines and substations from key generation plants to ensure evacuation flexibility and reliability of supply to load centers in line with N-1 principles.
- f) Ensure good coordination of grid system protection and operation and maintenance to prevent blackouts and power interruptions.
- g) Improve Project Management to ensure projects are completed on schedule, on budget and with right quality.
- h) Develop systematic distribution network plans based on established industry standards in line with load growth forecasts.
- i) Develop and implement a loss reduction strategy to reduce energy losses to 14.2% (2029) and 13.7% (2030)
- j) Introduce automation technologies to the distribution system to reduce power cuts and restoration time.
- k) Connect all Industrial Parks on priority basis.
- l) Construct underground distribution system in advanced urban areas and newly developed high-end urban areas.
- m) Design and build a climate resilient power infrastructure.

### 4.1.3. Tariff Evolution

Strategic Objective (SO3) – **Develop a tariff trajectory with clear milestones based on effective engagement with IPPs, financiers and other stakeholders to achieve affordable tariff.**

#### Rationale

This objective considered the fact that high tariffs make it difficult to attract industry and commercial usage on large scale and the need to provide affordability options for household users.

#### Key Considerations

- The need to make the industry tariff competitive in region,
- To enhance operational efficiency and thus cost reduction,
- Dilute the high-cost energy mix and reduce subsidy dependency,
- Energy losses and thus need for effective loss reduction strategies.
- In low growth scenarios, there will be a sustained need for subsidy on capital investments support to avoid tariff escalation.
- Innovative PPA arrangements will be critical in reducing the tariff level in the long run,
- New generation investments to be approved considering optimizing supply availability and cost,
- Blend generation investments with GoR involvement in power generation and onboarding IPPs on a competitive basis,

- A cost reflective tariff methodology is applied,

Table 4: Projected tariff trajectory

	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031	2031/ 2032	2032/ 2033	2033/ 2034
Existing end-user tariff (FRW/kWh)	186.0	186.0	186.0	186.0	186.0	186.0	186.0	186.0	186.0	186.0
Existing end-user tariff (USD/kWh)	0.138	0.134	0.126	0.118	0.118	0.106	0.100	0.095	0.089	0.084
Average generation tariff (USD/kWh)	0.142	0.138	0.135	0.133	0.132	0.131	0.131	0.132	0.132	0.132
Average end-use tariff (exchange risk averted) (FRW/kWh)	191.4	190.6	199.4	209.6	220.6	231.0	244.1	259.3	274.8	291.0
Forecasted exchange rate USD/FRW	1348	1384	1477	1573	1666	1759	1858	1965	2080	2205

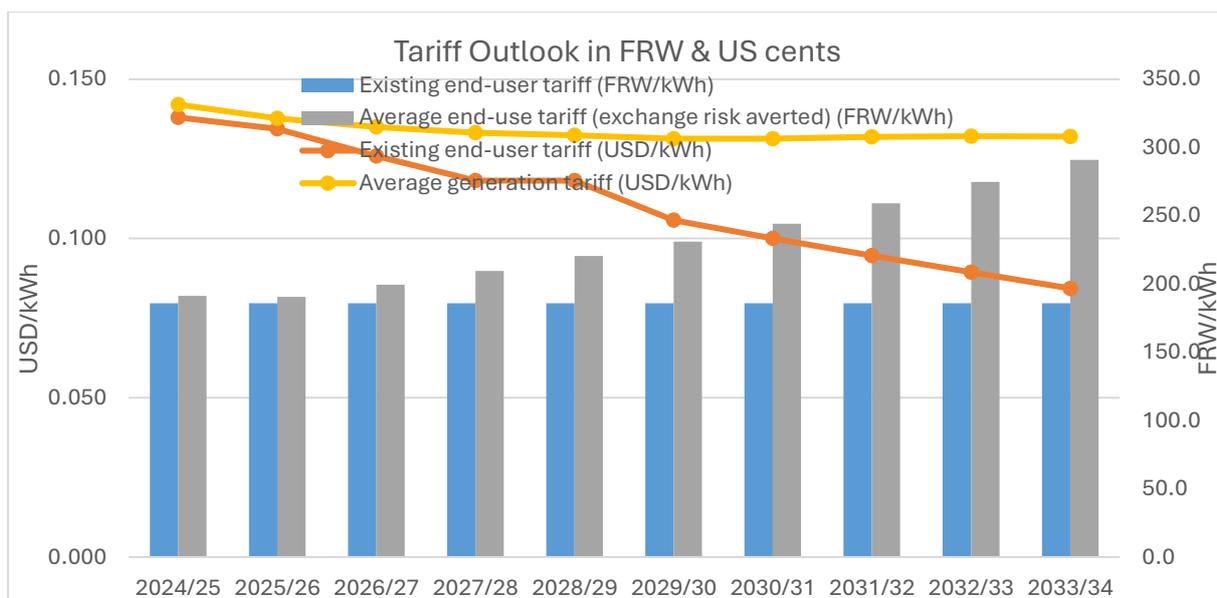


Figure 8: Projected tariff outlook in RWF vs US cents.

## Strategic Initiatives

- Establish benchmark generation tariffs where any new generation projects that exceed the benchmark have direct funding to GoR subsidy.
- Conduct Utility Revenue Requirements (RR) studies and Tariff benchmarking analyses to inform medium and long-term planning at least once every 3 years.
- Develop a model to clearly present segmented cost-drivers for Generation, Transmission, Distribution tariffs to enable effective cost control,
- Cost reflective tariff will not be affordable before 2026 hence the need for subsidy support.
- All PPAs and other material inputs to remain in US\$ yet the end user tariff is fixed in RWF; this will increase pressure on working capital – as graphically illustrated below:

## 4.2. Pillar 2: Ensure universal access to modern and clean energy.

### 4.2.1. Universal Electricity Access

Strategic Objective (SO4) – **Achieve 100% national access to electricity driven based on grid and off-grid solutions.**

#### Rationale

The National access target under NST-1 was to achieve 100% by 2024 but by June 2024, stood at 78.9% thus in a shortfall. The access targets have been formulated based on the targets and priorities in the National Strategy for Transformation (NST-2), Energy Sector Strategic Plan 2024-2029, SE4All Rwanda Action Agenda, and Vision 2050 and they are designed to be met under the different expansion scenarios in the generation pillar, all of which are derived based on the 15% reserve margin requirement.

Other considerations include:

- the challenge that grid intervention not economically feasible for some areas and thus the need for a blend of grid and off-grid solutions,
- The need fast-track access for urban and productive user areas,
- implement electrification policy.

#### Strategic Initiatives

- a) Conduct short to medium term (7 – 10 yrs.) zonal demand forecasting as part of integrated system planning based on bottom-up principles considering consumer surveys and end-user modelling.
- b) Achieve 100% access for Kigali City by June 2026
- c) Ensure 100% Electricity access for productive users e.g., Industrial zones, Udukiriro, factories, Schools, Hospitals etc. by June 2026

Use a blend of Grid, Mini-grid and off-grid solutions to provide access to 85% of all households by end June 2026 and 100% by 2029 doing business as usual scenario or 100% by 2027 using unconventional approach blended with prefinancing and EPC plus financing,

- d) Households located in areas identified/ marked as high-risk zones will not provide with electricity connections in line with Government policy for organized and safe settlements.
- e) Optimize Investment to fast-track Access connections by:
  - i) Implementing a connection policy where Organized Community settlements far from the grid are served through mini-grids and individual households with solar home systems.
  - ii) Assess the appropriate connection solution (grid/mini grid/off grid) for a given area/ cell based on two criteria: *Average Consumption* and *Distance from the Grid*.

## 4.2.2. Access to modern and efficient cooking technologies

Strategic Objective (SO5) – **Scale up use of efficient cooking technologies, increase adoption of clean cooking solutions and achieve full adoption of clean and efficient cooking technologies and heat production by institutional and commercial entities.**

### Rationale

The National access target under NST-1 was to halve the number of households depending on firewood as a source of energy for cooking from 80% to 42% by 2024 but by the Census of 2022, this share stood at 76.1% thus in a shortfall, with 32% of private households owning energy-saving stoves, of which 4.6% on LPG. The targets have been formulated based on the targets and priorities in the National Strategy for Transformation (NST-2), Energy Sector Strategic Plan 2024-2029, SE4All Rwanda Action Agenda, COP28 Presidential Pledges, and long-term national, regional, and continental aspirations (Rwanda Vision 2050, EAC Vision 2050, AU Agenda 2063) and they are designed to be met under the different expansion scenarios for which the National Integrated Clean Cooking Plan provides detailed trajectories, required investments, access and adoptions levels.

Other considerations include:

- the necessity to expedite grid reinforcement to pave foundation for electric cooking.
- Insufficient data to effectively monitor interventions and allow timely decision making of corrective measures to redress clean cooking interventions,
- The need to expand and streamline supply chains and distribution systems for efficient and clean cooking fuels especially in rural areas (LPG, pellets) to support higher residential adoption.
- To need to direct programmatic emphasis to higher tier clean cooking technologies in addition to Improved Cookstoves.

### Strategic Initiatives

- a) Finalize the National Integrated Clean Cooking Plan as a tool for planning, monitoring, and investment mobilization to effectively support implementation of clean cooking strategic objectives.
- b) Support efforts to streamline the coordination framework and attract investments in the clean cooking subsector.
- c) Streamline domestic markets and distribution systems for fuels production and distribution.
- d) Achieve 39% of households using clean cooking technologies and 61% improved cook stoves by June 2029
- e) Ensure 100% adoption of clean cooking by commercial establishments (hotels, restaurants, factories) and public institutions (schools, prisons,)
- f) Disseminate tier 3 improved cooked stove for low-income households predominantly in rural areas.
- g) Accelerate adoption of higher tier (4&5) clean cooking technologies predominantly in urban areas.
- h) Improve performance monitoring for clean cooking interventions by establishing a robust data governance to timely collect information and take corrective action.

### 4.3. Pillar 3: Enhance operational efficiency and drive innovation and by leveraging digitalization through integration of smart-grid transformation and automation.

#### 4.3.1. Operations and Maintenance

Strategic Objective (SO6) – **Ensure optimized plant and network operations for excellent service reliability, with most economical plan.**

#### Rationale

- Objective drawn against a scenario of high outages and frequent blackouts.
- Significant dependency on diesel fuel for operations
- Fluctuating water levels and thus straining operational efficiency of hydro power plants.
- Low quality of supply and limited customer orientation
- The need to streamline network planning and investment to improve reliability.

#### A Case for Change in Operations

The Utility continues to undertake measures to improve efficiency in operations and the following *Table 5* provides examples of the key levers for change that will be detailed in the EUCL’s business plan which will operationalize the commitments in this strategic plan.

*Table 5: Required changes in operations.*

Possible service level improvements	Accountability	Implement fully the customer service charter
High losses at 18%	System losses	Low losses <= 13.7% by 2034
Relatively high reliability of power supply (SAIDI/SAIFI Measures) in the region	Company brand and image	Higher service reliability
Good level of service delivery	Customer satisfaction	A new customer orientation and customer metrics to make customers happier
Professionalism and performance orientation	Organization culture	Enhance the PIP model on commercial KPIs from top to operational level
4 days for households and 34 days for large customers	New connection processes	1 day for households and 20 days for large customers
Existing standards for corporate operations and projects	Quality processes and operations	Aim for further emerging standards and improve assurance of existing standards

#### Strategic Initiatives for Network Operations

- a) Modernise and renovate grid to enhance operation efficiency.
- b) Develop and implement a robust preventive and predictive plan for Plant and Network maintenance.
- c) Update Standard Operating Procedures (SOPs) for compliance with international standards (IEEE, IEC, ISO, etc....) to ensure consistency in service provisioning and quality.

- d) Enforce the Standards as laid out in the Grid Code and Tariff code for IPPs and Large Customers
- e) Achieve certification in at least 4 standards areas (Occupational Health & Safety Management System (OHSAS); Quality Management System (QMS); Risk Management or Information Security Management (ISMS); Environment or Energy Management System (EMS)).
- f) Develop and implement an effective loss reduction strategy to reduce losses from 18% to 13.7%.
- g) Acquire Equipment and Skills to Introduce live maintenance practices to minimize service disruption.
- h) Secure long-term partnerships with reputable suppliers for plants maintenance.
- i) Upgrade REG workshop to provide maintenance and repairs of transformers and other light plant and network equipment.

### **Strategic Initiatives for Operational Efficiency of Corporate Services**

- j) Implement cost reduction initiatives to improve the Company balance sheets.
- k) Increase Income generation by investing in EV charging stations.
- l) Install Real time monitoring of REG Premises.
- m) Ensure ecosystem and Eco-sustainability of the reusable scattered metallic materials.
- n) Construct a modern archives center for proper data management.
- o) Implement effective land management for REG lands.
- p) Collaborate with stakeholders MININFRA/RURA on setting up a framework for energy audits to increase end-users' energy efficiency.
- q) Advocate for review of duration of subsidies for industries to encourage efficient energy use.

#### **4.3.2. Digitization and Smart Grid**

Strategic Objective (SO7) – **Equip REG with modern IT infrastructure to maintain power grid stability and improve reliability.**

##### **Rationale**

Geared towards Rwanda Vision 2050 development aspirations of modern technology, innovation, research, quality infrastructure to contribute to building competitiveness and integration. Correspondingly the NST-2 priority 7 stipulates to accelerate digital transformation, digital skills and widescale adoption of technology across sectors. In addition, emerging technologies of the energy transition to decarbonisation pathways such as BESS, EVs necessitate smart grids for effective integration.

Other key considerations:

- Wide national coverage of optic fiber and 4G network
- Existence of communication protocols
- Emerging smart grid solutions (sensors, software, etc...)
- Need to sustain realisations from existing systems (IFS, CMS, EMS) and the implementation of the ongoing SCADA/DMS revamping project.

## Strategic Initiatives

- a) Equip REG with state-of-the-art IT infrastructure including roll out smart technologies (SCADA/DMS/EMS, GIS, CMS, AMI/MDM).
- b) Achieve Corporate integration through the Installation of Business management systems driven by modern technologies *e.g., IBMS, Revenue Protection, Customer Management System, Distribution Management System, Smart Meters, GIS etc. by June 2027*
- c) Upgrade existing systems (Integrated business management system (IFS & CMS/IRMS, GIS system, Ms Exchange)
- d) Equip REG with necessary equipment (servers, switches, laptops, printers, home internet, modems etc.) to support efficient operations.
- e) Increase the number of inhouse systems and reduce maintenance costs.

### 4.3.3. Research, Development, and Innovation

Strategic Objective (SO8) – **Conduct research on the electricity value chain to inform strategic decision and adapt to evolving energy landscapes.**

The aim is to ensure Research and Development in REG augments the overall corporate strategy and promotes innovation to capture practical, cost-effective technologies for adoption into the Company mainstream activities.

#### Rationale

- National strategic objectives anchored on competitiveness and integration.
- R&D initiatives and adoption of technological innovations lead to cost-effective solutions.
- Need for quality energy infrastructure that ensure energy security, reliability, and resilience of the Rwanda Energy System.
- Emerging and ever-evolving renewable and clean energy solutions.
- Growing considerations of environmental sustainability underpinning the energy sector.
- Grid Modernization.

#### Key Priority Areas for Research and Development

- Renewable energy integration and storage.
- Research in grid-scale battery technologies, pumped hydro storage, and innovative storage systems to enable consistent power supply from renewable energy sources.
- Smart grid technologies and energy management.
- Transition from traditional cooking technologies to cleaner and efficient cooking technology.
- Energy efficiency and demand-side management.
- Data analytics.

#### Strategic Initiatives

- a) Develop advanced energy storage solutions to mitigate the intermittent nature of renewable sources like solar and wind.
- b) Investigate smart grid technologies for real-time monitoring, demand response, and efficient energy distribution.

- c) Conduct R&D to identify energy efficiency opportunities across main sectors (residential, commercial, institutional, and industrial) and sensitize high adoption of end-use energy efficiency.
- d) Strengthen data analytics and predictive modelling capabilities to analyse energy consumption patterns, grid performance, and emerging trends, enabling proactive decision-making and optimization.
- e) Implement pilot projects to test and demonstrate new technologies and solutions in energy landscape, allowing for practical validation before full-scale deployment.
- f) Identify and assess REG operational challenges and translate those into research projects and addressing them through scientific methods.
- g) Undertake policy research on emerging trends (electricity markets, distributed renewable energy, etc.).

## 4.4. Pillar 4: Promote sustainable practice, Inclusive and transparent work environment.

### 4.4.1. Gender Mainstreaming

Strategic Objective (SO9) – **Advance Gender Mainstreaming in company policies and operations.**

#### Rationale

- Ensure the compliance with legal framework for gender balance namely National Constitution, Regional and international context of gender Equality.
- Ensure institutional compliance with gender guidelines in the national planning framework.

#### Key Priority Areas for Gender Mainstreaming

- Enhance Gender related Capacity development.
- Creation of Gender friendly and safe workplace.
- Institutionalize internal structures for gender promotion.
- Promotion of gender equality and equity.
- Increase female workforce participation in the institution.

#### Strategic Initiatives

- a) Create an enabling environment for gender equality mainstreaming throughout REG.
- b) Integrate Gender in REG Appraisal contract (IMIHIGO).
- c) Implement REG's affirmative action plan.
- d) Adopt Equal Career Opportunities Policy
- e) Provision of internship and employment opportunities to both male and female graduates and enhancing mentorship programs to interns.
- f) Initiate and workshops/Training - Personal Dev. for Woman Professionals in Energy sector and encourage them to attend.
- g) Create a safe and gender responsive environment at workplace.
- h) Establish a partnership with and create STEM Awareness Sessions for Students, aspiring to join STEM fields and Energy Sector.

### 4.4.2. Corporate Governance

Strategic Objective (SO10) – **Cultivate a corporate culture that prioritizes ethics and compliance with legal and regulatory requirements.**

#### Rationale

- The functional strategies identified in this plan can only be realized by putting in place structures, systems policies and procedures that support efficient implementation.
- The need to attract, develop and retain staff with the requisite skills for effective implementation.

## Strategic Initiatives

- a) Provide legal support in business identification and sustainability of EDCL as a self-sustained Budget entity by June 2027 functioning with corporate autonomy (*per Company Law and Corporate Governance Best Practice*).
- b) Improve the financial performance of EUCL and prepare the Company for Stock Market Listing by 2031 (4 years) *with interim milestones of maintaining Clean Audit and Profitability of  $\geq 5\%$  (by Year 3)*.
- c) Live out by the customer-oriented value by creating and delivering products and services that are aligned to the needs of Customers/Users.
- d) Engage stakeholders in process to transform EDCL into a viable corporate entity by June 2027 with distinct operations and revenue streams.
- e) Restructure the EPC to increase corporate revenue base:
  - o Establish systems, structures and profile REG/EDCL Company and personnel that respond to the needs of EPC functionalities.
  - o Establish Partnerships with local, regional and international Institutions engaged in development and maintenance of energy projects for business purposes (*e.g. Provision of Engineering, Procurement, and Construction related services, Consultancy, Project Development and Management Services to the ESI and related Projects*).
- f) Strengthen structures and specialized teams with skills in PPA design and negotiations, Project Management, Tariff design and modelling.
- g) Maintain effective Performance Management System that ensures that staff work is continuously monitored and directed to achieve the desired goals.
- h) Review and implement an enabling policy on whistle blowing with clear incentives for reporters,
- i) Enhance risk management and Compliance in project development and corporate affairs.
- j) Efficient coordination in compliance with legal requirements and good governance (transparency and accountability, strategic oversight and long-term vision).
- k) Improve infrastructure security management.
- l) Enhance Board effectiveness and independence.

### 4.4.3. Communication, Branding and Awareness

Strategic Objective (SO11) – **Modernize stakeholders' engagement for effective service delivery, transparency and company visibility.**

#### Rationale

- The REG Strategy and initiatives must be understood and supported by our key stakeholders.
- The Strategy cannot be implemented successfully by REG in isolation and thus Communication enables continuous engagement with internal and external stakeholders e.g., *End-users, Government, Development Partners, IPPs, Banks, REG Staff, Service Providers and Public*

## Strategic Initiatives

- a) Develop a comprehensive education and awareness programme for internal & external stakeholders across relevant media platforms:
  - to increase by 1.5% annually positive perception & commitment.
  - (a baseline will be determined by the survey which will be carried out in the 1<sup>st</sup> year)
- b) Strengthen media relations to ensure positive perception and institute a daily media monitoring system to address any negative publicity.
- c) Conduct Semi Annual Large Customer Forums to reinforce awareness on progress of projects and service improvements.
- d) Develop and implement a Corporate Social Responsibility (CSR) Policy and Action Plan to support Brand Visibility
- e) Streamline Branding at REG and its subsidiary companies to ensure effective visibility.
- f) Develop periodic briefs, fliers, brochures, and other communication materials to disseminate information on key Service developments.
- g) Organize workshops and exhibitions in collaboration with partners to engage institutional stakeholders for ongoing collaboration and support to REG programmes.
- h) Empower Branches and Hubs with resources and materials to strategically engage with the local community on key service developments.
- i) Empower the external link directorate to act as one stop centre for all internal and external communications and coordinating for all delegations and external guests coming to REG.
- j) Develop and maintain a database for all REG institutional and individual stakeholders.
- k) Capitalise on sports teams to increase the revenue base.

### 4.4.4. Capacity Development

Strategic Objective (SO12) – **Enhance staff’s professional and technical capacity to support REG consistently deliver on its mission.**

#### Rationale

- The need to attract, develop and retain staff with the requisite skills for effective implementation.
- REG has set capacity building priorities considering the national development objectives in power generation capacity, 100% access, service quality and reliability objectives.
- Capacity Building will include targeted short-term trainings & professional courses, technical & non-technical.
- Current structure has 1,590 staff and is filled at about 80% with female staff comprising of about 22.8% of the workforce.
- Performance gaps have been identified that will be bridged through capacity development plan.

## Key Priority Areas for Capacity Development

The key strategic capacity development areas include among others:

- Energy Planning
- Project Management
- Construction & supervision of power infrastructure
- Testing & Commissioning of power infrastructure
- Operation & Maintenance of power Infrastructure
- Standards
- Health & Safety
- Network Protection
- Loss Reduction and Power System Efficiency
- Off-grid technologies
- Certification of IPP team
- Revenue Assurance and Protection
- Business development
- Customer Relationship Management
- Financial Management
- Human Resources Management
- Procurement
- PPAs, Bi-lateral energy agreements & concession agreements
- IT infrastructure & Business Applications
- Audit & compliance
- Contract Management
- Gender Mainstreaming

## Strategic Initiatives

Key strategic capacity development approaches include among others:

- a) Short-term training programmes.
- b) In-country group and team focused training
- c) Corporate attachments to Benchmark
- d) Professional associations
- e) Expert exchange programmes
- f) Apprenticeship schemes especially for technical skills in O&M
- g) On Job Training
- h) Counterpart practical attachments
- i) Online, Webinars, and syndicated web-based trainings
- j) Capitalise on Training and Certifications as a revenue stream
- k) Enhance HR capacity (deploy staff and train) in key areas of the Group including a Project Management function to ensure effective project development and implementation to eliminate time and cost overruns.

## 4.5. Pillar 5: Enhance resource mobilisation and drive profitability through strategic revenue diversification.

### 4.5.1. Commercial Strategy

Strategic Objective (SO13) – **To serve our customers and ensure their satisfaction through our culture of excellence.**

#### Rationale

- Improve profitability.
- Increase revenues base.
- To provide quality services.
- To increase customer and stake holder satisfaction level.
- Increase customer base connections.
- Increase application of modern technology.
- Improve strategic skills.
- Improve meter management skills.
- Improve staff work ethics.
- To reduce processes and cost of doing business.
- Improved billing efficiency.
- Increasing other sources revenues.

#### Strategic Initiatives

- A. Increase revenues.
  - a) Improvement of effective recovery and Debt Collection Management strategies
  - b) Reliable electricity vending system 24/7
  - c) Improved meter readings and billing efficiency
  - d) Commercial loss reduction
  - e) Increase other sources of revenues.
- B. Quality service delivery
  - f) Improve customers and stakeholder satisfaction.
  - g) Enhance customer relationship management of Modern customer care applications that interact with customers.
  - h) Re-modelling of customer service centre.

### 4.5.2. Stakeholders' engagement and Partnerships

Strategic Objective (SO14) – **Boost stakeholders' engagement and partnerships for effective service delivery.**

#### Rationale

Achievement of strategic objectives in areas of corporate governance, resource mobilisation and stakeholder engagement can only be effective through engagement and forging adequate partnerships. These partnerships act as enablers and shall be strengthened in the initial implementation timelines of this strategic plan to bring together all the enablers for the achievement of the strategic objectives herein.

## Emerging Trends

- Partnerships on emerging trends such as SDGs, clean cooking, renewable energy acceleration, climate action, energy efficiency (APRA; Clean Cooking Alliance)
- Emerging public private partnerships
- South-South Cooperation for acceleration of infrastructure programs/projects

## Strategic initiatives

- a) Establish collaboration with Academic and Research Institutions and form partnerships with universities, research institutes, and international organizations to leverage their expertise, resources, and funding for joint R&D projects in energy development.
- b) Increase South-South Cooperation for acceleration of infrastructure programs/projects.
- c) Participate in investment mobilisation forums.
- d) Sustain established partnerships and aim for new ones.
- e) Increase REG participation in regional and international space.
- f) Advocate for the establishment of a gas utility.

### 4.5.3. Resource mobilisation

Strategic Objective (SO15) – **Boost resource and investment mobilisation to enable implementation of REG strategic objectives.**

#### Rationale

- Early availability of financing is critical for timely implementation of initiatives.
- Financing and Resource Mobilization as an enabler to achieving strategic objectives
- Need to derisk renewable energy infrastructure projects.
- Public Private Partnerships
- Private sector participation: pre-financing
- Aging infrastructure

## Emerging Trends

- Climate financing: Green funds, Carbon credits, green bonds
- Project derisking to fast-track renewable energy projects financing.
- Innovative financing instruments gaining prominence (blended financing)
- Traditional infrastructure options still work (long term development loans, concessional loans, equity)
- Government guarantees
- Expansion of green funds (national, regional, continental, and global)

## Strategic initiatives

- 1) Develop and regularly update Corporate Business Plans.

- 2) Participate in investment forums and develop collaboration with the relevant stakeholders to showcase investment opportunities in the Rwanda Energy Group.
- 3) Mobilize grants and concessional funds to invest in generation projects and refinance selected existing plants to dilute the high cost of the energy mix.
- 4) Diversify financing instruments and aim for green bonds, and other climate financing options.
- 5) Advocate for increased project derisking to increase energy infrastructure projects financing.



lightening protection, appropriate civil structure designs considering site-specific characteristics, extreme weather events such as once-in-a-time floods, landslides, etc. In addition other transition initiatives such as increased adoption of e-mobility and progressive displacement of non-electric fuel by electricity use such as solar thermal uses for heating, as well as other related transitional initiatives such as in strategic objectives 4.1.1 of “*building a balanced and cost optimized generation mix sufficient to meet growing demand*” and 4.2.2 of increasing “*access to modern and efficient cooking technologies*”.

### **5.1.3. Private sector investment and participation**

The diversification of the generation fleet will continue to include a relatively significant share of independent power producer owned generation. REG will undertake to use IPPs at baseload generation and will ensure that flexible power generation options are sourced from Government-owned power plants and other flexible power supply options such as imports. The Energy Private Developers will continue to play a pivotal role in the clean cooking sector as well by participating in streamlining domestic markets and distribution systems, investing in domestic fuel manufacturing and storage. REG will also continue working with private contractors (EPC) to advance infrastructure expansion and maintenance, and collectively with stakeholders, advocate for the establishment of a gas utility, building on advancements in gas extraction.

### **5.1.4. Energy efficiency**

Efficient energy use will continue to take centre-stage in power expansion. By on-boarding efficient clean and green energy technologies, and minimising power system losses as transcribed in the power transmission and distribution network strategic objective. Emphasis will also be made on demand-side management to raise awareness towards efficient end-users energy management to reduce the strain of the required energy consumption on the energy resources and distribution systems. In partnership with the MININFRA and RURA, advocacy will be conducted for energy audits to be mainstreamed as a means to increase corporate responsibility towards efficient use of energy. These include carbon capture and intensifying electricity use in the manufacturing (construction materials sub-sectors); and encouraging higher adoption of efficient appliances (air conditioners, fridges, cookstoves).

### **5.1.5. Energy security and security of supply**

Meeting the growing need for energy generation and distribution shall go in tandem with ensuring security of supply. This includes the traditional infrastructure design redundancies (15% reserve margins; N-1 principle for network systems, increasing fuel storage capacity, etc.). In addition, it will be important to align national demand growth to ensure a reasonable share of imported energy to insulate the Company and the energy sector from foreign exchange and other external supply shocks.

## 6. Financing Strategy

The overall goal of the REG financing strategy is in obtaining low cost and long-term funds for investment. This will enable recovery of capital and returns over a long horizon thus mitigating cost on the Group's cashflows, and the low financing burden will support the overall objective for diluting the cost of service given the high-cost energy mix. REG seeks to contribute to a competitive energy sector that meets Government objectives and builds a sustainable economy.

### 6.1. Main assumptions:

- a) End-user Tariff is assumed to progressively reduce in real terms (USD/kWh) to remain affordable compared to other regional utilities.
- b) Desired annual demand growth at 12%, with two sensitivity scenarios (the lowest 10% annual demand growth and the national strategic case of 15 % annual demand growth supported by targeted Government Initiatives.
- c) Increased Generation Cost (IPP) due to new generation plants from RWF 219 bn in 2025 to RWF 339 bn by 2027 but will be diluted by the commissioning of cheaper sources such as Nyabarongo II. And a number of small hydro power plants bringing 32.24 MW.
- d) In the second scenario (Operations and Demand Response), demand is assumed to grow at an average of 12% annually, modelled based on historical trends and latest demand forecasts.
- e) Annual demand growth of 15% per year, based on the possibility of unified, and multi-sectoral efforts to improve project implementation of bulk electricity loads to ensure demand forecasts materialise in a reasonable time as planned.
- f) Steady growth in industrialization driven by the national strategy to expand economic activity to utilize new generation capacity.
- g) Loss reduction base on the loss reduction strategy of about 0.7% annually with more reductions to be obtained in the first 3 years slowing down towards 2029 and beyond.
- h) REG to start off-grid partnerships model.
- i) Cash collections at 98% of sales growing towards 99% by 2029.
- j) Interest rates remain stable in range 14% - 16%.
- k) Continued strong partnership with Development Partners and Multilateral agencies for concessional capital of US\$ M 305.8 by 2029 and USD \$ M 557 by 2034.
- l) Grants amounting to about US\$ M 618, and other Long-term Capital; private US\$ M 1,352.3 and GoR US\$ M 691.7.
- m) The revenues from operations will cover Utility costs and any deficit from IPP costs obtained from GoR Subsidy. This is particularly emphasised in the historical growth (GDP growth) case, where the cost of excess generation is relatively higher.
- n) Some savings on project funds RUEAP, and other donor specific (AFDB, WB, SAUDI) funded projects will be deployed to access, especially in 2025/2026, and new projects under negotiations.
- o) REG will seek to contract long term loans to invest in projects thus relieving pressure on operational cash flows.
- p) Annual cost increase including inflation at 8%.

Table 6: Investment Outlook (Millions of USD)

Period	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031	2031/ 2032	2032/ 2033	2033/ 2034	Total
Generation	32.7	24.3	25.2	31.5	46.9	34.1	32.2	35.3	93.5	193.3	548.9
Transmission	66.2	85.4	-	47.8	81.2	9.5	7.4	18.9	13.7	-	329.9
Distribution	19.5	69.0	19.0	13.5	16.6	13.1	9.8	10.1	12.1	10.9	193.7
Access	134.3	157.5	161.8	164.1	153.9	16.9	20.5	18.2	20.1	19.5	866.9
Clean cooking	77.1	76.3	75.5	74.8	74.0	75.3	76.6	75.9	75.1	74.4	754.9
Operations & Maintenance	13.5	20.4	12.3	8.9	12.3	11.1	14.6	18.8	13.3	9.6	134.9
Logistics, Support Infrastructure & Equipment	-	3.1	34.5	-	-	-	-	-	-	-	37.6
Working Capital	57.0	40.5	55.8	18.8	10.5	7.0	8.0	17.8	74.5	96.0	386.0
<b>Total Investment needs</b>	<b>400.4</b>	<b>476.5</b>	<b>384.2</b>	<b>359.4</b>	<b>395.4</b>	<b>167.0</b>	<b>169.1</b>	<b>194.9</b>	<b>302.3</b>	<b>403.7</b>	<b>3,252.8</b>
Financed by:											-
Operations	7.1	7.1	7.1	7.2	7.2	7.0	8.0	7.7	7.7	7.7	73.9
EPC	0.2	17.6	17.6	17.6	17.3	-	18.5	18.5	18.2	-	125.4
Concessional Loans	58.9	68.5	56.5	50.6	71.3	71.3	45.4	49.5	40.7	44.3	557.0
Other L/T Finance	146.2	198.3	127.8	102.4	116.9	31.2	50.6	73.4	194.6	310.8	1,352.3
Grants	124.8	121.6	117.9	123.8	130.0	6.5	0.6	0.0	0.0	0.0	625.2
GoR	63.2	63.4	57.2	57.8	52.6	51.0	46.0	45.8	41.1	41.0	519.0
<b>Total Required Financing</b>	<b>400.4</b>	<b>476.5</b>	<b>384.2</b>	<b>359.4</b>	<b>395.4</b>	<b>167.0</b>	<b>169.1</b>	<b>194.9</b>	<b>302.3</b>	<b>403.7</b>	<b>3,252.8</b>

Investment requirements amount to USD M 2,015.8 by 2029, and USD M 3,252.8 by 2034. This will largely be determined by the implementation effectiveness of strategic goals set by 2029 in energy generation, universal access to clean modern sources. Of this, USD M 907.69 is already available through existing programs/projects such as RUEAP, ASCENT, and bilateral cooperation programs such as China and Korea EXIM Banks, etc. However, due to funding allocation, areas such as clean cooking remain underfunded and are not covered by the existing programs to be able to achieve the desired targets. Thus, the financing mobilization ought to start this planning cycle at its highest to avail these required investments so as not to carry the heavier burden in the post 2029 horizon.

## 6.2. Financial Trajectories - Demand Sensitivity Analysis

### 6.2.1. Financing Strategy – GDP Growth Case

#### Historical (GDP Growth) Case: 10% annual demand growth

If the demand growth conditions are not attained to the maximum possible, and growth reflects the historical trends, the required additional funding will be higher.

Table 7: Financial overview 2024-2034 (GDP growth – Historical base case, “billions of RWF”)

Period	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Revenue	204.8	250.3	288.2	333.2	385.6	444.2	516.3	603.3	703.4	819.4
Cost of power	237.1	272.1	339.0	388.7	433.5	461.6	567.0	691.7	813.8	957.4
Gross profit	(32.3)	(21.8)	(50.8)	(55.5)	(47.9)	(17.4)	(50.6)	(88.4)	(110.4)	(138.0)
Subsidies and other revenues										
Subsidies	67.3	59.7	93.0	106.4	109.2	91.5	140.1	196.7	275.6	372.0
Other revenue	8.7	9.1	9.6	10.1	10.6	11.1	11.6	12.2	12.8	13.5
Other income	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	87.9	80.8	114.6	128.4	131.8	114.6	163.7	220.9	300.5	397.4

Period	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Operating expenses										
Distribution costs	4.5	4.9	5.3	5.7	6.2	6.7	7.2	7.8	8.4	9.1
Administrative expenses	36.5	38.4	41.4	44.7	48.3	52.2	56.4	60.9	65.7	71.0
Operating expenses	41.0	43.3	46.7	50.5	54.5	58.9	63.6	68.7	74.2	80.1
Operating profit/(loss)										
Operating profit/(loss)	14.6	15.7	17.0	22.4	29.4	38.3	49.5	63.8	115.9	179.3
Financing costs										
Financing costs	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Realisation of grants										
Realisation of grants	15.5	15.5	15.5	16.3	17.1	17.9	18.8	19.8	20.8	21.8
Depreciation and amortisation										
Depreciation and amortisation	23.1	24.2	25.5	31.7	39.5	49.2	61.4	76.6	129.7	194.1
Profit before tax										
Profit before tax	-	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Prediction of financial overview from 2024 to 2034

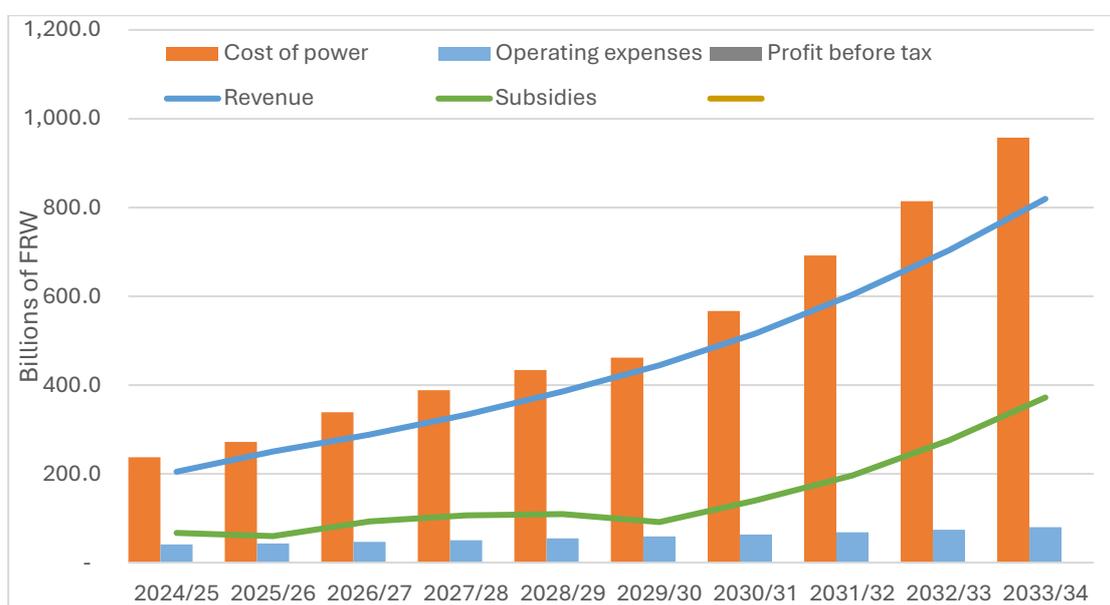


Figure 9: Comparison of key metrics-financial overview (GDP growth case)

From the above chart and the table: the projected growth of cost of power will decrease slightly in 2028-2030 reaching RWF 461.6 billion in 2029/2030 and RWF 957.4 billion in 2033/2034. The revenue will increase steadily from RWF 228.6 billion in 2024/2025 to RWF 385.6 billion in 2029 and RWF 819.4 billion in 2034. If the cost of excess generation is covered, the costs of power will remain below revenues throughout 2034. The operating expenses are expected to increase from RWF 40 billion 2024/2025 to RWF 54.5 billion in 2028/2029 and RWF 80.1 billion. The additional funding will progressively increase to counter slow demand growth and RWF/USD exchange rate depreciation, hence a strong need to onboard least cost power generation options.

- From this position, while revenues will grow over the planning period to RWF 385.6 bn, by 2029, the cost of power grows disproportionately higher, especially the period till 2031/2032.
- The subsidy requirement takes into account arrears and progressively declines in the cost of excess generation as demand growth progressively picks up during the planning horizon.

- c) The reduction in additional funding is facilitated by two reasons, the growth in demand that affords more optimal plant utilization and progressive loss reduction at a cumulative amount of 3.3% by 2029 and 4.3% over the period.
- d) It is notable that the Operating costs are forecasted to remain relatively stable over this period like the case before from RWF 41 bn in 2024/25 closing out at RWF 54.5 bn in 2028/29 and RWF 80.1 bn in 2034.
- e) Any other mitigating developments like tariff increase, accelerated loss reduction would reduce the pressure of additional funding requirement.

## 6.2.2. Financing Strategy – Operations and Demand Response Case

### Operational Sustainability Case: 12% annual demand growth

- a) The financial performance has two distinct phases, the period before and after 2027 marked by significant changes in generation mix.
- b) Annual revenues will grow on average from RWF 237 bn in 2024 to RWF 429.6 bn by 2029 and 999.0 by 2034.
- c) On the other hand, the cost of generation will increase throughout the planning horizon from RWF 237.1 bn to RWF 373.6 bn by 2029 and RWF 959.8 bn by 2034 initially driven by committed power plants as they are optimised and new power plants align with the least cost principle.
- d) This outlook is based on a relatively constant average tariff adjustment to the cost of power but effectively reducing in real terms as cheaper sources of power are developed and deployed. Table 4 presents this consideration. The latter will be crucial to counter annual inflation and forex depreciation. Increased energy cost (IPP) due to steady growth in industrialization will be subsidized by government.
- e) REG to start expanding its product portfolio to expand revenue stream options.
- f) Cash collections at 98% of sales.
- g) Interest rates remain stable starting at 14% and not exceeding 16%.

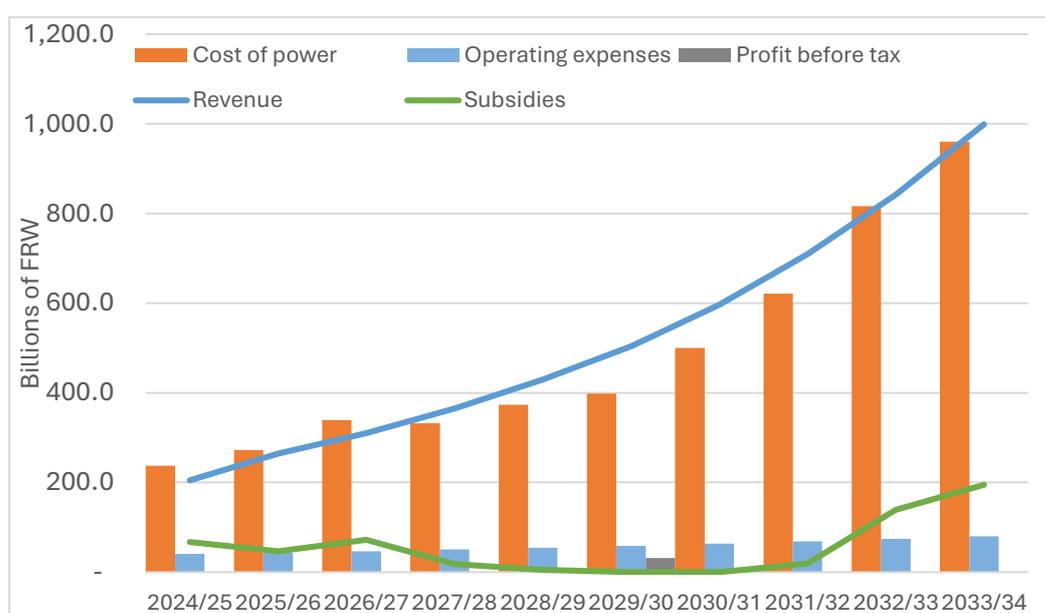


Figure 10: Financial overview in the Operational and Demand Response case scenario.

From the above chart and the table that follows: The cost of power will increase from RWF 237.1 bn in 2024 to RWF 373.6 bn in 2029 and RWF 959.8 bn in 2034. The revenue

will increase steadily from RWF 204.8 billion in 2024 to RWF 429.6 bn in 2029 and RWF 999.0 bn in 2034. With the support of subsidies to cover the excess of power, the cost of power will remain below revenues starting 2027/2028. The need for additional funding will steadily decline after 2029, but pick up slightly in 2032-2034, but if demand growth is maintained at 15% as presented in section 6.2.3, the need for subsidies could stabilise.

*Table 8: Financial overview 2024-2034 (Operational and Demand Response case, “billions of RWF”)*

Period	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Revenue	204.8	264.2	309.7	364.6	429.6	503.9	596.4	709.5	842.3	999.0
Cost of power	237.1	272.5	339.4	332.0	373.6	398.4	500.1	621.0	816.1	959.8
Gross profit	(32.3)	(8.3)	(29.7)	32.6	56.0	105.5	96.3	88.5	26.2	39.2
Subsidies and other revenues										
Subsidies	67.3	46.2	71.9	18.3	5.4	-	-	19.8	139.0	194.8
Other revenue	8.7	9.1	9.6	10.1	10.6	11.1	11.6	12.2	12.8	13.5
Other income	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	87.9	67.3	93.4	40.3	28.0	23.1	23.6	44.0	163.9	220.3
Operating expenses										
Distribution costs	4.5	4.9	5.3	5.7	6.2	6.7	7.2	7.8	8.4	9.1
Administrative expenses	36.5	38.4	41.4	44.7	48.3	52.2	56.4	60.9	65.7	71.0
Operating expenses	41.0	43.3	46.7	50.5	54.5	58.9	63.6	68.7	74.2	80.1
Operating profit/(loss)	14.6	15.7	17.0	22.4	29.4	69.7	56.3	63.8	115.9	179.3
Financing costs										
Realisation of grants	15.5	15.5	15.5	16.3	17.1	17.9	18.8	19.8	20.8	21.8
Depreciation and amortisation	23.1	24.2	25.5	31.7	39.5	49.2	61.4	76.6	129.7	194.1
Profit before tax	-	0.0	0.0	0.0	0.0	31.5	6.8	0.0	0.0	0.0

### 6.2.3. Financing Strategy – Strategic National Case

#### National Strategic Case: 15% annual demand growth

- h) The financial performance has two distinct phases, the period before and after 2026/2027 in line with significant changes in the power generation system adjust to meet a high demand growth in the early years.
- i) Annual Revenues will grow from RWF 204.8 bn in 2024 to RWF 503.4 bn by 2029 and RWF 1,336.1 bn in 2034.
- j) On the other hand, the cost of generation will increase from RWF 237.1 bn 2024 to RWF 410.0 bn 2029 and RWF 1,130.6 bn by 2034 driven initially by committed power plants as they are optimized and new power plants align with the least cost principle.
- k) This outlook is based on a relatively constant average tariff adjustment to the cost of power but effectively reducing in real terms as cheaper sources of power are developed and deployed. Table 4 presents this consideration. The latter will be crucial to counter annual inflation and forex depreciation. Increased energy cost (IPP) due to steady growth in industrialization will be subsidized by government.
- l) REG to start expanding its product portfolio to expand revenue stream options.

m) Cash collections at 98% of sales.

n) Interest rates remain stable starting at 14% and not exceeding 16%.

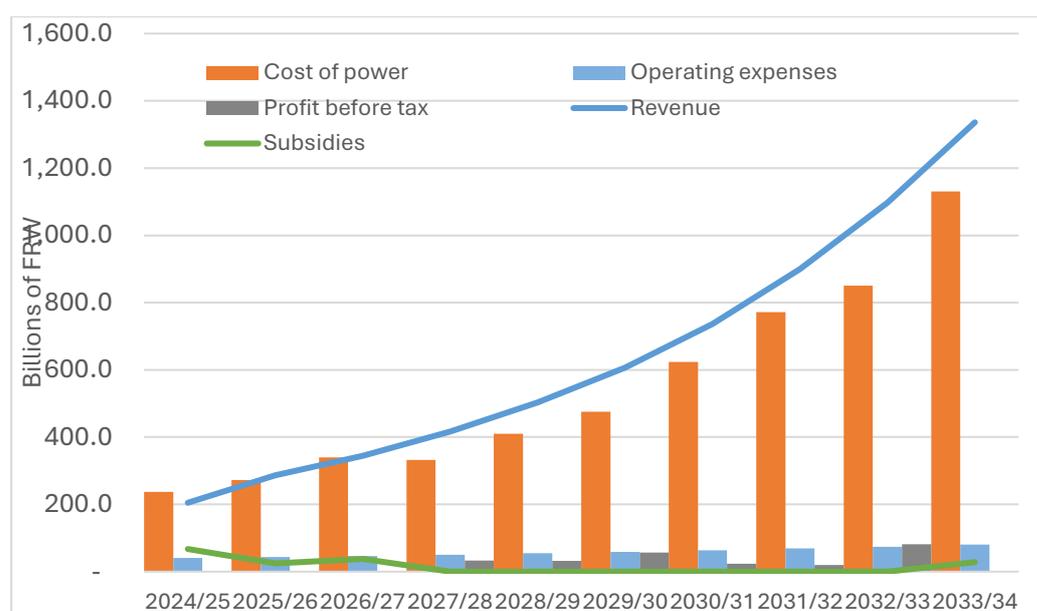


Figure 11: Financial overview in the National strategic case scenario

From the above chart and the table that follows: The cost of power will increase from slightly RWF 237.1 bn in 2024 to RWF 410 bn in 2029 and RWF 1,130 bn in 2034. The revenue will increase from RWF 204.8 bn in 2024 to RWF 503 bn in 2029 and RWF 1,336 bn in 2034. With the support of subsidies to cover the excess of power, the cost of power will remain below revenues throughout the planning horizon except the 1<sup>st</sup> year. The need for additional funding will be the lowest from any scenarios, and starting from 2027/2028, REG would not require additional subsidies to cover for excess generation.

Table 9: Financial overview 2024-2034 (National – strategic case, “billions of RWF”)

Period	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Revenue	204.8	286.0	344.2	416.1	503.4	606.3	736.8	900.0	1,097.1	1,336.1
Cost of power	237.1	272.5	339.4	332.0	410.0	475.2	623.4	771.9	850.9	1,130.6
Gross profit	(32.3)	13.5	4.8	84.1	93.4	131.1	113.4	128.2	246.2	205.4
Subsidies and other revenues										
Subsidies	67.3	24.4	37.3	-	-	-	-	-	-	28.5
Other revenue	8.7	9.1	9.6	10.1	10.6	11.1	11.6	12.2	12.8	13.5
Other income	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	87.9	45.5	58.9	22.1	22.6	23.1	23.6	24.2	24.8	54.0
Operating expenses										
Distribution costs	4.5	4.9	5.3	5.7	6.2	6.7	7.2	7.8	8.4	9.1
Administrative expenses	36.5	38.4	41.4	44.7	48.3	52.2	56.4	60.9	65.7	71.0
Operating expenses	41.0	43.3	46.7	50.5	54.5	58.9	63.6	68.7	74.2	80.1
Operating profit/(loss)	14.6	15.7	17.0	55.6	61.4	95.3	73.5	83.7	196.9	179.3
Financing costs										
Financing costs	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Realisation of grants	15.5	15.5	15.5	16.3	17.1	17.9	18.8	19.8	20.8	21.8
Depreciation and amortisation	23.1	24.2	25.5	31.7	39.5	49.2	61.4	76.6	129.7	194.1
Profit before tax	0.0	0.0	0.0	57.6	49.9	49.0	34.4	12.6	148.9	25.9

### 6.3. Financing Strategy – Costs and Funding

- a) Revenues are projected to grow driven by accelerated demand because targeted national incentives and policy to stimulate economic activity, how fast demand responds to these policy incentives and initiatives will largely drive the ultimate scenario among the 3 tested.
- b) The cost of power- will grow steadily in first 3 years as key committed power plants are commissioned into service to meet growing and projected demand. The cost of supply could potentially decline or stabilize by on-boarding competitive generation sources.
- c) The cost of power will peak in 2026/2027 and in 2031/2032 and stabilize afterwards as growth in demand is met by spare generation capacity.
- d) Demand growth in the period 2025-2027, will be served through increased plant optimization, (with some additional by imports) with negative marginal cost and thus progressive subsidy reduction from the highest of 2027/28 to progressive reduction throughout 2029 and beyond.
  - Imports will be required to flexibly meet system peak demand and maintain adequate reserve margins (15%) at the lowest possible cost.
- e) REG will seek to optimize its new investments in systems and other equipment and thus operating expenses will be maintained at less than 8% growth throughout the planning horizon.
- f) In addition to the projected additional funding support, in the 12% and 15% annual demand growth, the Company could only achieve positive profits from 2027/2028, if accelerated demand growth conditions are sustained, end-user tariff adjustments implemented to maintain exchange fluctuations; and subsidies for excess cost of power paid and arrears are cleared.
- g) The Company will also devote some resources in debt servicing RWF 7 bn throughout the planning horizon.

### Financial Observations

- In light of the foregoing two cases (National Strategic Case and Historical GDP Growth Case), the risk of demand growth on cost of generation is high, thus the need to foster electricity demand stimulating policies and aim 12%--15% annual demand growth, the higher the better.
- It remains strategically critical that efforts are made to dilute the cost of supply going forward by on-upholding the least cost principle in on-boarding power generation technologies.
- Re-structuring the financing of Hakan and SPLK to lower the cost of generation or extend the project lives to allow cost recovery over a longer period provides mitigation and in both cases.
- Refinancing using cheaper sources of capital (concessional funds) could also yield better results for the overall cost of power.
- The overriding objective is seeking to keep the tariff nominally stable but declining in real terms so as to attract investments that would in turn stimulate demand and ultimately optimize generation capacity.
- Least cost generation expansion will be crucial in mitigating foreign exchange depreciation and the related exchange exposure.

## 7. Implementation Coordination, Planning, Monitoring and Evaluation.

### 7.1. Institutional coordination framework

From higher level development plans, coordination is emphasized to streamline and orient different efforts towards realization of common objectives. The institutional arrangement for REG to deliver on its objectives requires strong coordination mechanisms. Different institutions play different roles in delivering the strategic objectives set forth. The range and scope of these institutions differs: from oversight to policy guidance and strategic orientation to technical coordination implementation strategic implementation and discussion different stakeholders and partners national and subnational levels. At the upper level, MINECOFIN and MININFRA.

*Table 10: Key functions, roles, and Institutions for REG strategic plan implementation*

#	Key role	Key Institution/Organs
1.	Oversight	MINECOFIN, MININFRA
2.	Policy guidance and strategic orientation	MINECOFIN, MININFRA
3.	Coordination with Clusters and Joint Imihigo	MINECOFIN, MININFRA
4.	Ensuring the alignment between DDSs and Districts Imihigo and their contribution to strategic objectives/targets	MINECOFIN, MININFRA, MINALOC, Districts & City of Kigali
5.	Technical Coordination	MININFRA
6.	Implementation of Strategic Plans and Investments	REG Board of Directors
7.	Energy sector level dialogue, ownership, and accountability of the development agenda by all stakeholders at the sector level.	SWG, JSRs
8.	Joint Sector Reviews (forward and backward reviews)	SWG, JSRs
9.	Monitoring of progress of the strategic plan Development and monitoring of satellite strategies	MININFRA
10.	Monitoring and Evaluation of the strategic plan; Annual Reports, Monitoring of KPIs; ensuring the alignment between annual budget planning and Investment projects.	MININFRA, MINECOFIN, RURA
11.	Monitoring the alignment of programming and financing with strategic pillars, Sector, and NST-1 and Vision 2050 objectives.	MINECOFIN, MININFRA, RURA
12.	Promoting cooperation between the public sector and the private sector to deliver on the strategic plan	RDB, MININFRA, RURA, MINECOFIN, BRD, RMB, MINICOM
13.	Fostering integrated planning for accurate and timely electricity generation, network expansion planning, and energy efficiency	MININFRA, MINECOFIN, MINICOM, MoH, MINEDUC, RDB, RTDA, RMB, RAB, REMA, Districts & City of Kigali

## 7.2. Implementation Planning, Monitoring and Evaluation Framework

For a long-term horizon of the span of this strategic plan, effective implementation monitoring is crucial for detection of early warning signs, timely undertaking of corrective measure to support effective implementation. With the Company’s commitment to transparency, and accountability to different stakeholders (customers, shareholders, contractors, investors, donors and lenders, the Government, and the public at large), effectiveness of these processes builds stakeholders’ confidence in the management and guide further reviews of alternatives formulations.

This entails building and strengthening information systems to ensure high quality data and analysis leveraging effective coordination mechanisms presented in section 7.1 – of the institutional frameworks as provided for by the sector and NST-2 frameworks. Appropriate internal implementation monitoring mechanisms will also be put in place to support the achievement of higher lever priority actions presented in Annex 1. The targets of these actions will represent key indicators covering industry focused objectives and are presented in *Table 11* below.

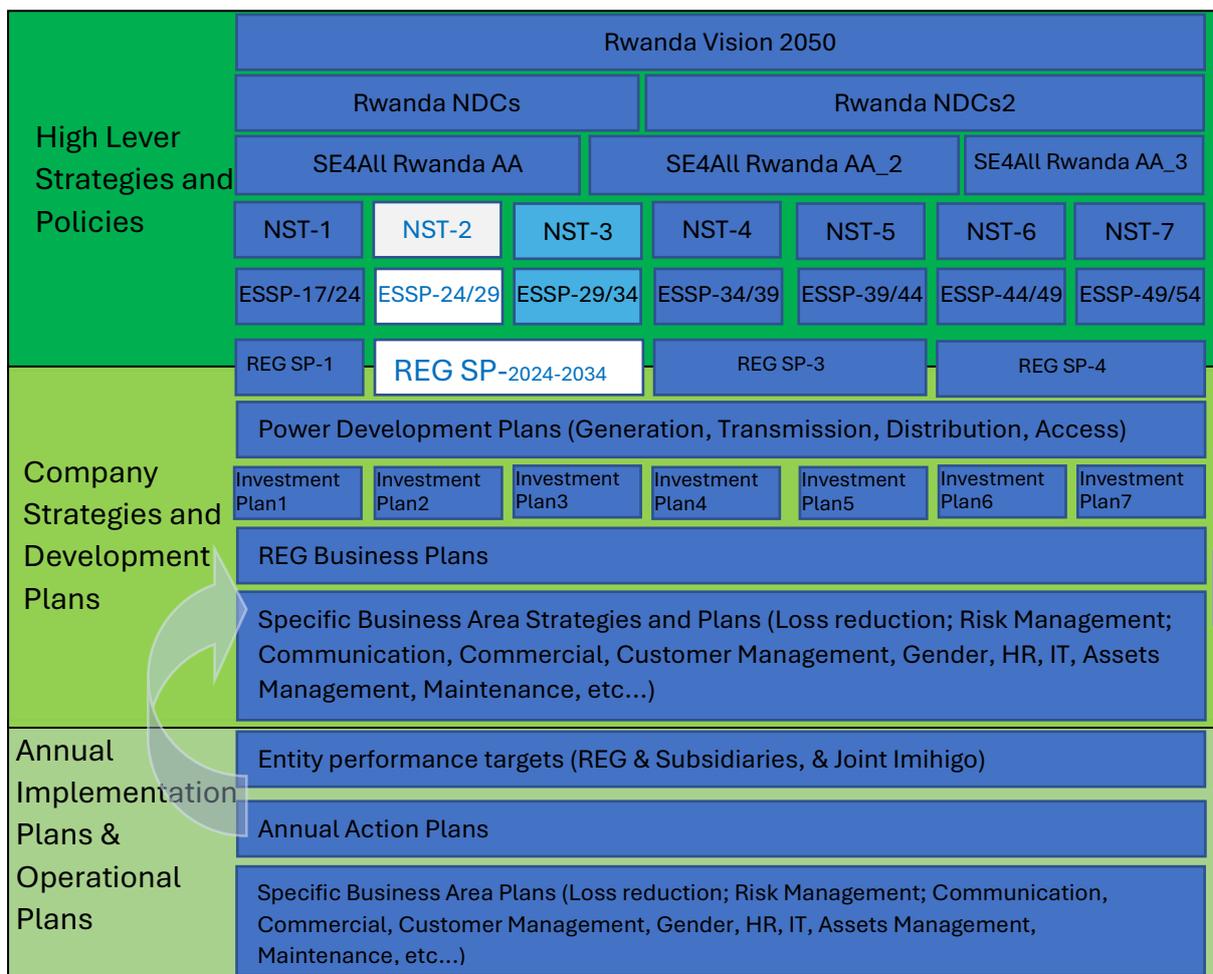


Figure 12: Implementation planning, monitoring, and evaluation framework.

The monitoring mechanisms to this strategy will include quarterly performance reviews and the Sector Working Group to serve especially on high level target objectives with the support of the Technical Working Groups. Annual Action Plans shall be developed to provide short term activities to be implemented towards realization of the strategic goals.

### 7.3. Key performance indicators aligned to NST2 & ESSP

As provided for by the national monitoring and evaluation mechanisms, reviews will be conducted internally and together with stakeholders within the Sector Working Groups to evaluate performance in line with commitments in this strategy. Annual performance appraisals will be conducted to serve as short term evaluation mechanisms to remain steered toward the delivery of strategic objectives. Mid-term reviews of this strategy shall be conducted to gather lessons learnt during implementation and ensure re-alignment of the strategy with the evolving operating sphere as appropriate.

Table 11: Key Performance Indicators and Monitoring Matrix

KPIs Monitoring Matrix High Level Target Objective	Indicator	Baseline	Target across the years				Responsible Institution	Data Source
			2026/2027	2028/29	2031/32	2033/34		
Power generation installed capacity	MW	406	507	641	826	1,066	MININFRA, REG	REG Reports
Transmission network length	km	1158	1270.01	1539.81	1640.81	1709.81	MININFRA, REG	MININFRA, REG Reports
Distribution network length	km	11,389.92 km of MV lines 21,084.14 km of LV lines	12,480 km of MV 23,392 km of LV	13,039 km of MV 24,575 km of LV	13,136 km of MV 24,749 km of LV	13,168 km of MV 24,810 km of LV	MININFRA, REG	MININFRA, REG Reports
Reliability of electricity supply improved: average number of power interruptions per year reduced to 17.4 and average number of hours without power to 11.4	SAIFI (avg no of interruptions)	21.0	19.6	18.3	17.8	17.4	MININFRA, REG	MININFRA, REG Reports
	SAIDI (avg hrs without power)	14.9	13.4	12.0	11.6	11.4	MININFRA, REG	MININFRA, REG Reports
Losses in the system networks (transmission, distribution, and commercial) reduced to 13.7%	% losses in system	18%	15.2%	14.2%	13.7%	13.7%	MININFRA, REG	MININFRA, REG Reports
Household access to electricity increased to 100%	%	78.9%	91.8%	100.0%	100.0%	100.0%	MININFRA, REG	REG Reports, EICV Survey

KPIs Monitoring Matrix High Level Target Objective	Indicator	Baseline	Target across the years				Responsible Institution	Data Source
			2026/2027	2028/29	2031/32	2033/34		
Grid connected HHs	% of HHs	55.9%	67.3%	75.0%	76.8%	77.0%	MININFRA, REG	REG Reports, EICV Survey
HHs using off-grid	% of HHs	23%	24.5%	25.0%	23.2%	23.0%	MININFRA, REG	REG Reports, EICV Survey
Productive user access to electricity increased to 100%	% productive users connected	86%	94%	100%	100%	100%	MININFRA, REG	MININFRA, REG Reports
Increased network of street lights on new and existing national and urban roads	km	2227	2705.2	3189	3368	3538	MININFRA, REG	MININFRA, REG Reports
% of households using efficient biomass cook stoves Tier 3+4 (Firewood, charcoal, pellets, briquettes stoves) and non-biomass stoves (Electric, LPG, ethanol...stoves)	% of HHs	34%	88%	100%	99%	100%	MININFRA, REG MoE, REMA, BRD, EPD	MININFRA, REG Reports, EICV Survey

## 7.4. Risks and Mitigation

Risks and opportunities are systematically identified, rigorously analysed and cost-effectively managed on REG wide basis, in a manner consistent with REG’s risk appetite and business model for creating value.

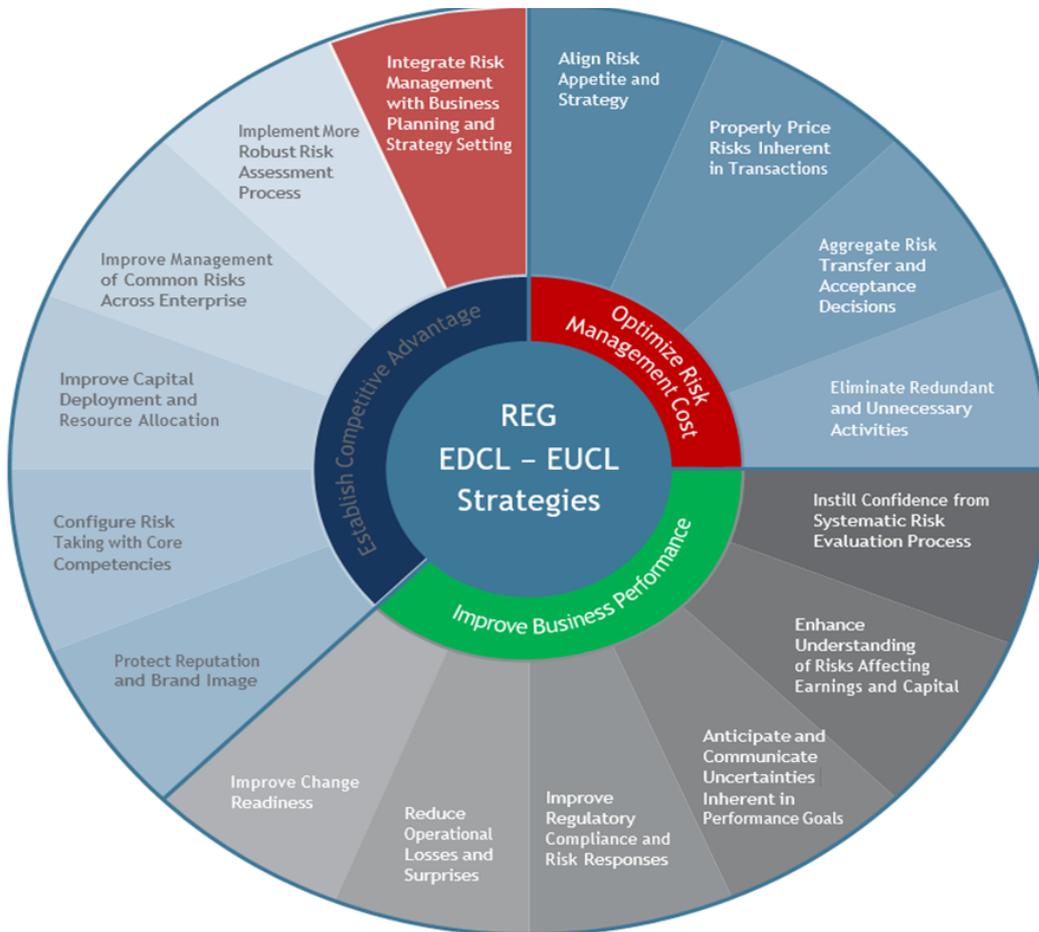


Figure 13: REG’s strategic risk management approach.

Strategic Risks that can affect the implementation of the strategic plan were identified. The potential risks, their impact, and their likelihood of occurrence were analysed and mitigation measures are presented in Table 12 below:

Table 12: Risk assessment and mitigation

Risk Description		Risk Rating	Mitigation Measures
Rising service costs due to high production expenses and elevated end-user tariffs		High	<ul style="list-style-type: none"> <li>▪ Prioritize least-cost generation expansion</li> </ul>
Foreign Exchange		High	<ul style="list-style-type: none"> <li>▪ Source funding in local currency.</li> <li>▪ Develop a pool of foreign currency within the revenue stream</li> </ul>
Challenges in capacity and facility optimization		Medium	<ul style="list-style-type: none"> <li>▪ Optimize and scale-up selected existing power plants (Peat, Methane)</li> </ul>
Gap between peak and off-peak demand		High	<ul style="list-style-type: none"> <li>▪ Advocate for targeted tariffs</li> </ul>
Costly emergency solutions/ancillary services		High	<ul style="list-style-type: none"> <li>▪ Increase share of government-owned generation</li> </ul>
Prospects of supply disruption		Medium	<ul style="list-style-type: none"> <li>▪ Strengthen regional collaboration</li> </ul>
Timely implementation of institutional reform (REG/EDCL/EUCL)		Medium	<ul style="list-style-type: none"> <li>▪ Allocate resources for institutional reforms and financial sustainability</li> </ul>
<b>levels</b>	<b>Range</b>	<b>levels</b>	<b>Range</b>
Extreme	[ 16 – 25 ]	High	[ 9 – 15 ]
		Medium	[ 4 – 8 ]
		Low	[ 1 – 3 ]

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## Annex 1 – Implementation Matrix of Priority Actions (per year) aligned to NST-2/ESSP

Pillar / Priority Results	Key Priority Actions Across the Period									
	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
<b>Generation - Build a Balanced and Cost Optimized Generation Mix sufficient to meet Growing Demand</b>										
Power generation additional installed capacity	4.13 MW added to the grid	71.542 MW added to the grid	52.419 MW added to the grid	62.95 MW added to the grid	50.325 MW added to the grid	51.2 MW added to the grid	88 MW added to the grid	30 MW added to the grid	106 MW added to the grid	60 MW added to the grid
<b>Transmission - Plan and Build infrastructure to ensure timely alignment of current and future Generation with National Demand</b>										
Km of High Voltage Transmission lines constructed	0	112.01 km High Voltage Lines constructed	248.8 km High Voltage Lines constructed	21 km High Voltage Lines constructed	92 km High Voltage Lines constructed	15 km High Voltage Lines constructed	9 km High Voltage Lines constructed	42 km High Voltage Lines constructed	27 km High Voltage Lines constructed	0
<b>Distribution - Develop and Operate an Optimized Distribution Network to Enhance Utility Efficiency and Reliability of Power Supply</b>										
Distribution Network Constructed/Strengthened	365.7 km of MV Lines, 774.1 km of LV Lines	372.6 km of MV Lines, 788.9 km of LV Lines	351.7 km of MV Lines, 744.5 km of LV Lines	279.5 km of MV Lines, 591.7 km of LV Lines	279.5 km of MV Lines, 591.7 km of LV Lines	40 km of LV Lines, 71 km of MV Lines	29 km of LV Lines, 54 km of MV Lines	30 km of LV Lines, 56 km of MV Lines	38 km of LV Lines, 64 km of MV Lines	32 km of LV Lines, 61 km of MV Lines
Increased network of streetlights on new and existing national and urban roads	2,286 km	2,555 km	2,705 km	2,870 km	3,189 km	3,237 km	3,286 km	3,368 km	3,452 km	3,538 km
<b>Electricity - Achieve 100% National Access to Electricity using Grid and Off-grid Solutions</b>										
New households (HHs) will be connected to the grid.	200,000 New HHs connected to the Grid	235,243 New HHs connected to the Grid	241,911 New HHs connected to the Grid	245,989 New HHs connected to the Grid	231,011 New HHs connected to the Grid	112,507 New HHs connected to the Grid	136,786 New HHs connected to the Grid	121,156 New HHs connected to the Grid	110,473 New HHs connected to the Grid	117,269 New HHs connected to the Grid
New households (HHs) connected through Off-grid Solutions	57,620 New HHs connected through off-grid	46,125 New HHs connected through off-grid	45,879 New HHs connected through off-grid	42,523 New HHs connected through off-grid	37,570 New HHs connected through off-grid	9,608 New HHs connected through off-grid	316 New HHs connected through off-grid	8,227 New HHs connected through off-grid	34,916 New HHs connected through off-grid	19,492 New HHs connected through off-grid
Productive user of electricity provided with access to electricity	500 New PUAs supplied with electricity	630 New PUAs supplied with electricity	650 New PUAs supplied with electricity	450 New PUAs supplied with electricity	300 New PUAs supplied with electricity	100 New PUAs supplied with electricity	100 New PUAs supplied with electricity	100 New PUAs supplied with electricity	100 New PUAs supplied with electricity	100 New PUAs supplied with electricity
<b>Operations and Maintenance - Ensure optimized plant and network operations for excellent service reliability, with most economical plan</b>										
Reduce total customer outages (System Average Interruption Frequency Index "SAIFI")	Average no. of	Average no. of	Average no. of	Average no. of	Average no. of	Average no. of				

Pillar / Priority Results	Key Priority Actions Across the Period									
	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
	interruptions reduced to 21.0	interruptions reduced to 20.3	interruptions reduced to 19.6	interruptions reduced to 18.9	interruptions reduced to 18.3	interruptions reduced to 18.1	interruptions reduced to 17.9	interruptions reduced to 17.8	interruptions reduced to 17.6	interruptions reduced to 17.4
Reduce duration of customer outages (System Average Interruption Duration Index "SAIDI")	Average hrs without power reduced to 14.9	Average hrs without power reduced to 14.1	Average hrs without power reduced to 13.4	Average hrs without power reduced to 12.7	Average hrs without power reduced to 12.0	Average hrs without power reduced to 11.9	Average hrs without power reduced to 11.8	Average hrs without power reduced to 11.6	Average hrs without power reduced to 11.5	Average hrs without power reduced to 11.4
Losses in the transmission and distribution networks reduced to 13.7%	Total losses reduced to 17.6%	Total losses reduced to 15.9%	Total losses reduced to 15.2%	Total losses reduced to 14.7%	Total losses reduced to 14.2%	Total losses reduced to 13.7%				
<b>Energy Efficiency- Increased the number of households using efficient cook stoves</b>										
Number of households using efficient biomass cook stoves Tier 3&4 (Firewood, charcoal, pellets, briquettes stoves)	386,461 HHs with Tier 3&4 cookstoves	463,754 HHs with Tier 3&4 cookstoves	309,171 HHs with Tier 3&4 cookstoves	231,878 HHs with Tier 3&4 cookstoves	154,587 HHs with Tier 3&4 cookstoves	161,836 HHs with Tier 3&4 cookstoves	194,203 HHs with Tier 3&4 cookstoves	129,469 HHs with Tier 3&4 cookstoves	97,102 HHs with Tier 3&4 cookstoves	64,737 HHs with Tier 3&4 cookstoves
Number of households with access to clean non-biomass stoves in Urban areas (Electric, LPG, ethanol...stoves)	342,404 HHs with Tier 4&5 cookstoves	410,885 HHs with Tier 4&5 cookstoves	273,924 HHs with Tier 4&5 cookstoves	205,443 HHs with Tier 4&5 cookstoves	136,963 HHs with Tier 4&5 cookstoves	139,352 HHs with Tier 4&5 cookstoves	167,221 HHs with Tier 4&5 cookstoves	111,482 HHs with Tier 4&5 cookstoves	83,612 HHs with Tier 4&5 cookstoves	55,742 HHs with Tier 4&5 cookstoves

## Annex 2 – Key Performance Indicators (KPI & targets) aligned to NST-2/ESSP

KPIs Monitoring Matrix			Target across the years									
High Level Target Objective	Indicator	Baseline	2024/2025	2025/2026	2026/2027	2027/2028	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Power generation installed capacity	MW	406	410	482	507	591	641	709	850	870	1,006	1,066
Transmission network length	km	1158	1,158	1,158	1,270	1,519	1,540	1,632	1,632	1,641	1,683	1,710
Distribution network length	km	11,389.92 km of MV lines	11,756 km of MV	12,128 km of MV	12,480 km of MV	12,759 km of MV	13,039 km of MV	13,068 km of MV	13,098 km of MV	13,136 km of MV	13,168 km of MV	13,168 km of MV
		21,084.14 km of LV lines	21,858 km of LV	22,647 km of LV	23,392 km of LV	23,983 km of LV	24,575 km of LV	24,629 km of LV	24,685 km of LV	24,749 km of LV	24,810 km of LV	24,810 km of LV
Reliability of electricity supply improved: average number of power interruptions per year reduced to 18.3 and average number of hours without power to 12.0	SAIFI (avg no of interruptions)	21.0	21.0	20.3	19.6	18.9	18.3	18.1	17.9	17.8	17.6	17.4
	SAIDI (avg hrs without power)	14.9	14.9	14.1	13.4	12.7	12.0	11.9	11.8	11.6	11.5	11.4
Losses in the system networks (transmission, distribution, and commercial) reduced to 14.2%	% losses in system	18%	16.60%	15.90%	15.20%	14.70%	14.20%	13.70%	13.70%	13.70%	13.70%	13.70%
Household access to electricity increased to 100%	%	78.9%	82%	87%	92%	96%	100%	100%	100%	100%	100%	100%
Grid connected HHs	% of HHs	55.9%	58%	63%	67%	71%	75%	75.5%	76%	77%	77%	77%
HHs using off-grid	% of HHs	23%	24%	24%	25%	25%	25%	24.5%	24%	23%	23%	23%
Productive user access to electricity increased to 100%	% productive users connected	86%	89%	92%	94%	97%	100%	100%	100%	100%	100%	100%
Increased network of street lights on new and existing national and urban roads	km	2,227.0 km	2,285.9 km	2,555.2 km	2,705.2 km	2,870.2 km	3,189.0 km	3,237.0 km	3,286.0 km	3,368.0 km	3,452.0 km	3,538.0 km
% of households using efficient biomass cook stoves Tier 3+4 (Firewood, charcoal, pellets, briquettes stoves) and non-biomass stoves (Electric, LPG, ethanol...stoves)	% of HHs	34%	53%	75%	88%	96%	100%	100%	99%	99%	100%	100%



